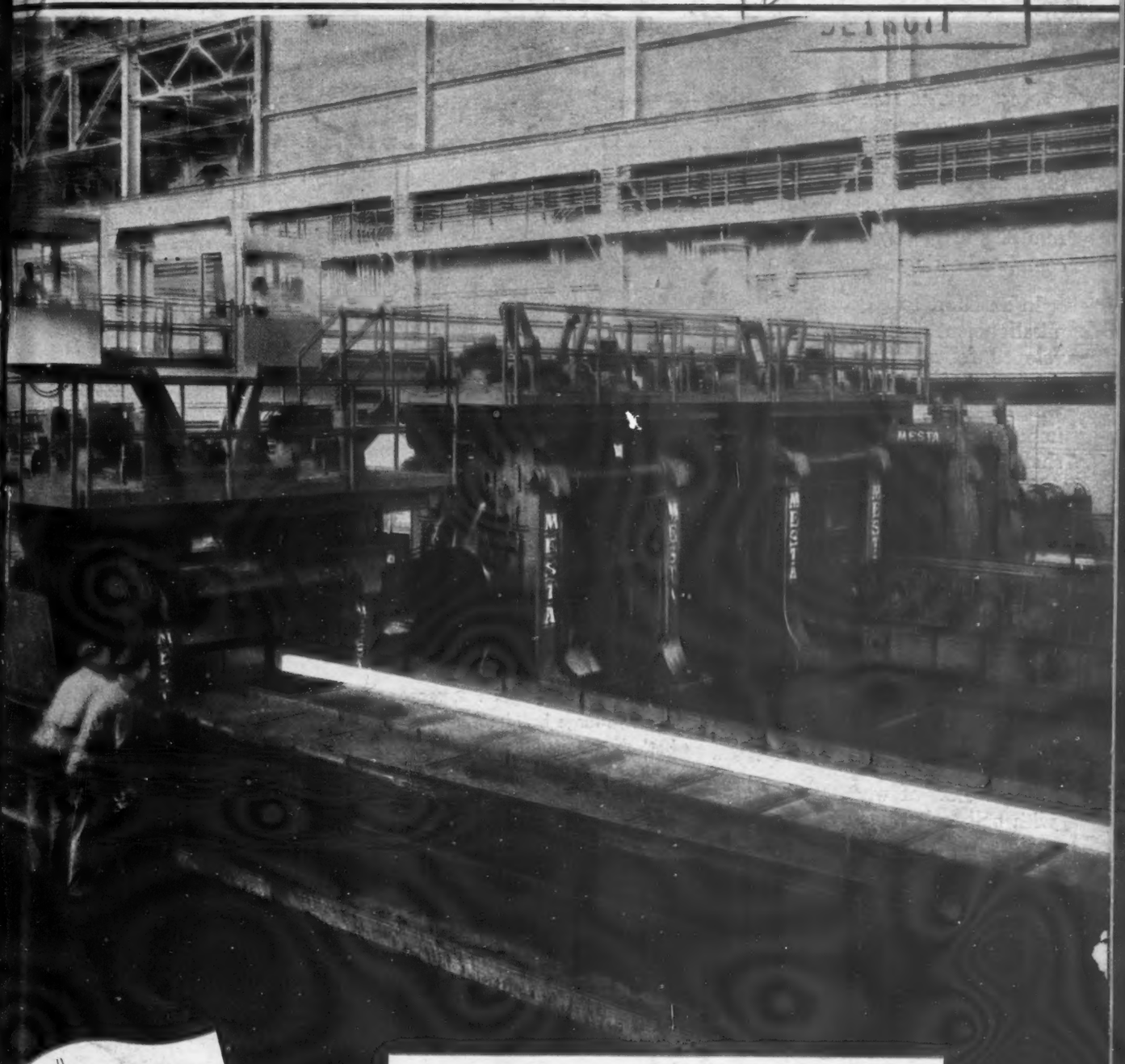
March 12, 1945

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

TECHNOLOGY DEPT. LIBRARY MAR 12 1945 DETROIT



Mesta 29" Structural Mill
Showing Traveling Tilting Table

The Army-Navy "E" flag with four stars, flies over the Mesta Plant

MESTA MACHINE COMPANY • PITTSBURGH, PA.

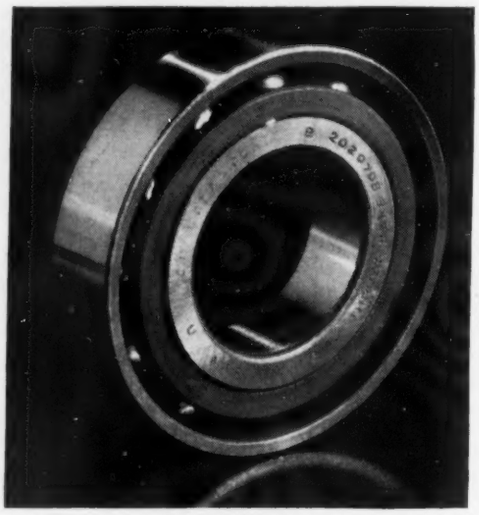
[PUMP TIPS FROM ALLIS-CHALMERS — ONE IN A SERIES]

How to make BEARINGS Last Longer . . .

ONE OF THE MAIN CAUSES of bearing trouble is misalignment. For when pump and its driving motor are not correctly aligned, every revolution of the shaft throws tremendous extra load on all moving parts within the pump's closely fitted body — resulting in greatly accelerated wear, oftentimes in complete bearing failure.

In an effort to eliminate the misalignment factor, A-C developed, for many applications, the "Electrifugal" pump — in which both motor and pump impeller are mounted on one shaft and in one frame. This *unit-design* prevents shaft from getting out of line . . . minimizes possibility of excessive bearing wear.

However, many pumps in use today are coupled to *separate* driving motors. In guarding against misalignment in this type pump, see that coupling flanges are perfectly aligned — and that they're kept that way!



Allis-Chalmers "Electrifugal" Pumps are equipped with two large ball bearings which support *both* the rotor and runner on one shaft.

Regardless of whether your pumps are equipped with ball, roller or sleeve bearings, here are a few maintenance tips that can prove useful to you in getting longer life out of bearings:

▶ Although too much oil won't harm sleeve bearings, too much grease in anti-friction type bearings will *promote* friction and heat. Main job of grease in anti-friction bearings is to protect steel elements against corrosion, not friction.

▶ No one rule on lubrication frequency fits all pump installations. So play safe: if anything, change lubricant *before* it's too worn or too dirty.

▶ Once a month, check bearing temperatures with a thermometer . . . *not by hand.*

▶ In the case of sleeve bearings, measure bearings for wear every three months, replacing them if wear is excessive. Generally allow two-thousandths of an inch clearance — plus one-thousandth of an inch for each inch of shaft journal diameter.

▶ Every three months, drain lubricant, washing out oil wells and bearings with kerosene. In the case of sleeve bearings, check to see that oil rings are free to turn with the shaft.

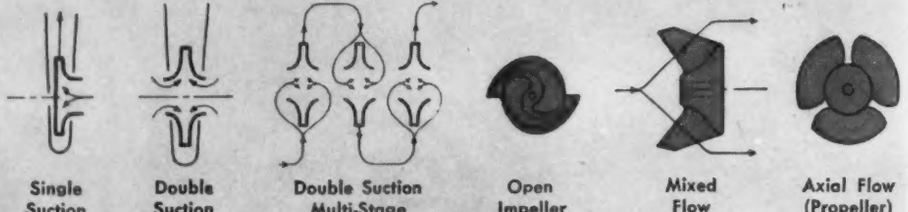
▶ If you haven't done so already, send for Allis-Chalmers' *free* "Handbook for Wartime Care of Centrifugal Pumps". Applies to *all* makes of pumps; contains *no* advertising. Contents include: valuable tables of friction losses; handy guide to locating trouble; wartime maintenance schedule. Address your request to ALLIS-CHALMERS MFG. CO., MILWAUKEE 1, WIS.

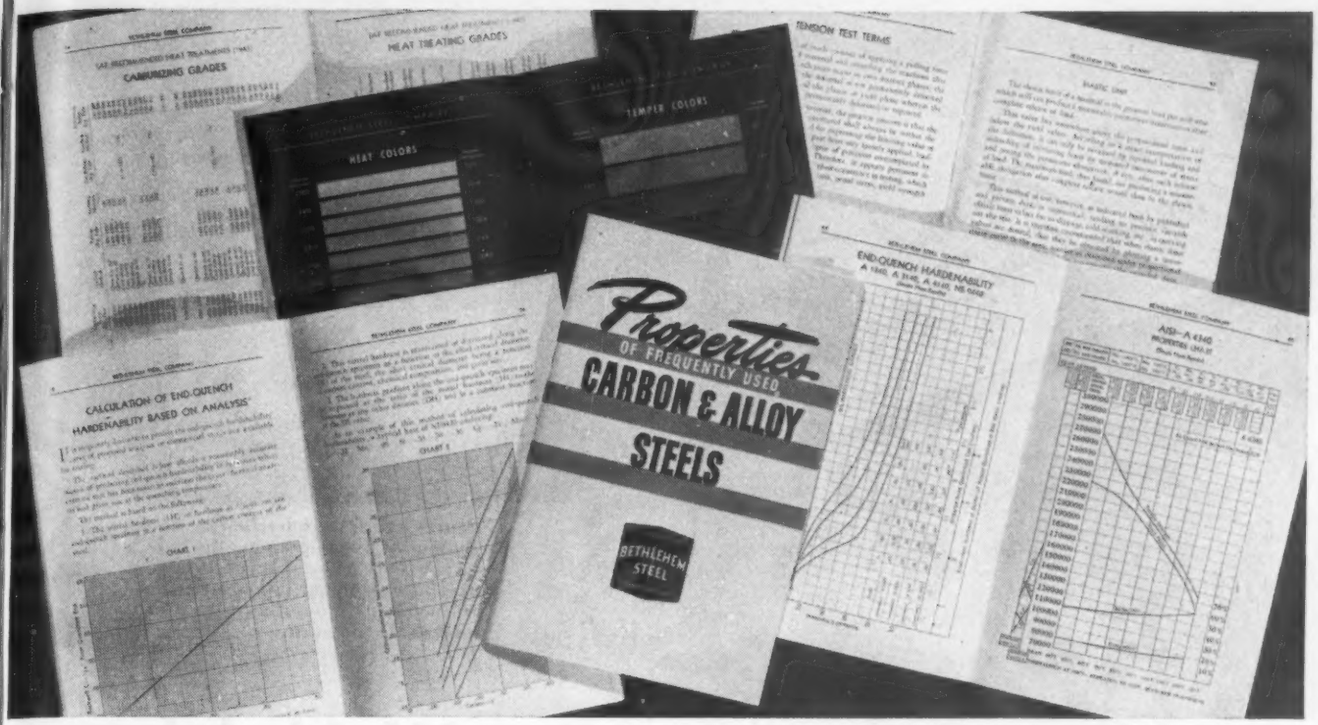
A 1709

♪ *Tune in the Boston Symphony, Blue Network, every Saturday at 8:30 pm, EWT.*

ALLIS-CHALMERS PUMPS

Allis-Chalmers builds all types and variations of pumps shown at right. Capacities from 10 to 150,000 gpm—heads to 2500 lbs.





Have you up-to-the-minute data on TODAY'S STEELS?

For the man who uses, specifies, or purchases today's steels, Bethlehem has prepared a pocket guide that will be useful every day of the year. It's a 100-page book entitled *Properties of Frequently Used Carbon and Alloy Steels*—and it's packed with graphs, tables, and other explanatory material that will tell you most of the things you want to know about the steels in commonest use today, including the more popular NE grades.

Here's just one way this condensed encyclopedia will answer your questions:

Suppose you're interested in the deep-hardening group of steels that includes A 4340, NE 8740 and NE 9540. You may want to know tensile strengths and yield points after annealing, normalizing, or quenching and drawing at various temperatures. You turn to pages 65, 66, and 67 for the properties charts that give you this information. Then, if you're interested in end-quench hardenability curves, refer to page 68 and you have the depth characteristics of each composition.

Charts and curves of this nature are but one feature of the book. Also included are such timely subjects as case and core properties of carburized steel, quenching media, composition hardenability, and many others. The information is based on more than a year's research, laboratory tests, and cross-checking by Bethlehem metallurgists.

The usefulness of the book is attested by the thousands of copies already in the hands of men all over the country who buy, machine, and heat-treat steel. Write for your copy today!

Partial Contents

Charts in full color showing actual heat and temper colors.

36 charts showing properties of frequently-used steels.

Lists of AISI carbon and alloy steels.

SAE recommended heat treatments.

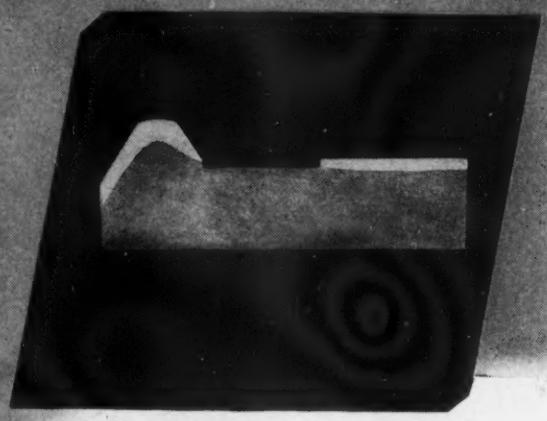
End-quench hardenability charts.

Tension-test terms.

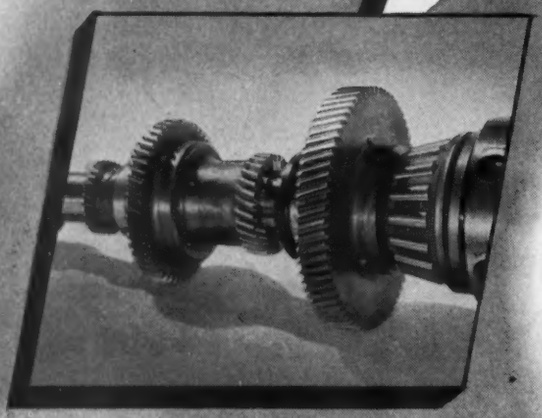
Send for FREE Copy. *Your request will immediately bring you a copy of this book, free of charge. Address: Bethlehem Steel Company, Bethlehem, Pa.*

BETHLEHEM STEEL

These Monarch Features mean Lower Turning Costs

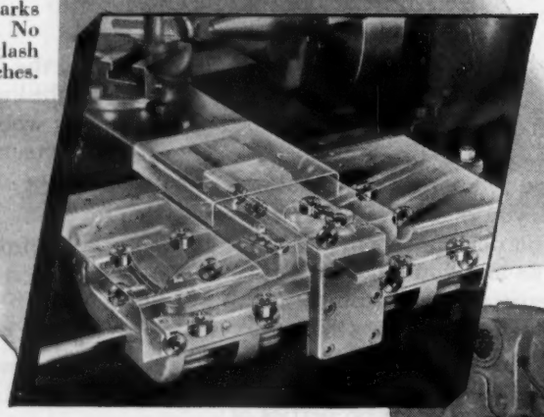


Flame-hardened bedways—help reduce costs by maintaining the lathe's accuracy over many years of use. More than 18,000 Monarch lathes with flame-hardened beds prove the value of this Monarch development.

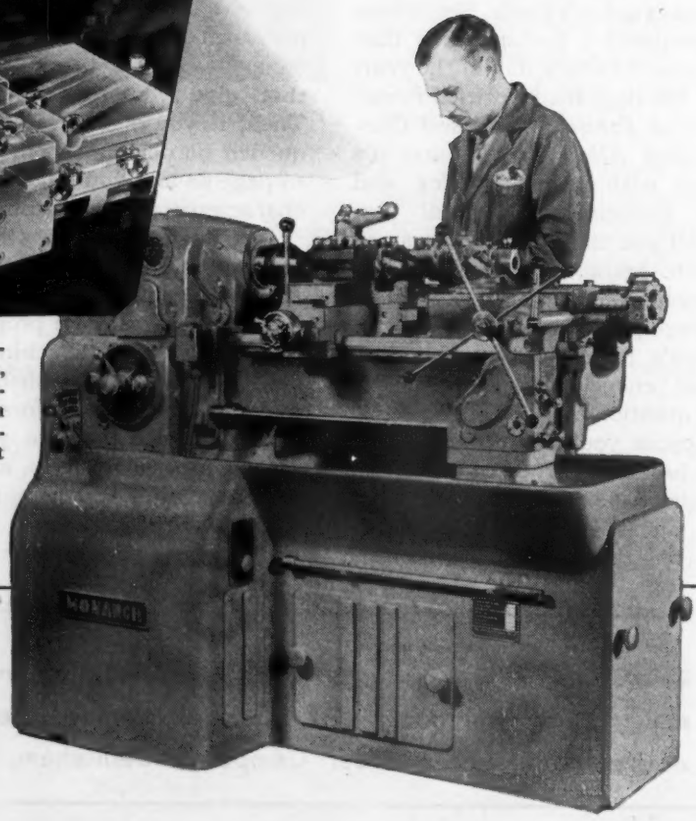


Helical gears—adopted by Monarch in 1924. Eliminate noise, chatter and gear tooth marks from finished work. No lost motion or backlash between the jaw clutches.

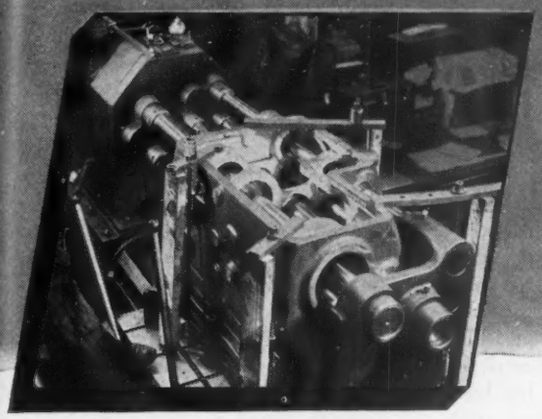
We'd like to al



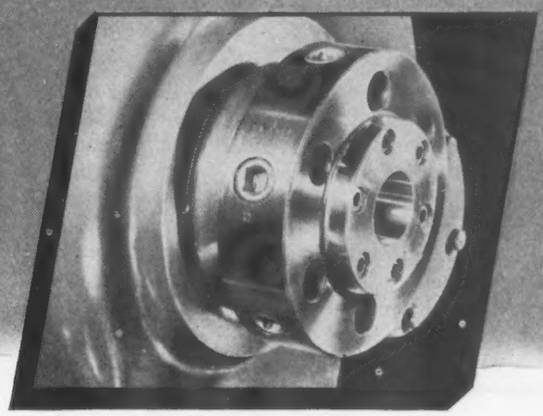
Ball-bearing taper attachment—turns or bores accurate, smooth tapers under all conditions. Permits heavier cuts than with conventional type of attachment. Nothing to wear or get out of adjustment.



Monarch 10" hi-speed production lathe—provides unmatched speed and accuracy for the production of many small parts. Spindle speeds up to 5,000 rpm, or higher, may be obtained with this Monarch lathe.



Inside turning—rough and finish boring of fifteen holes in headstock are done at one setting on this Monarch lathe, greatly reducing time required and assuring precise accuracy in location of holes.



Camlock spindle nose—retains accuracy throughout life of the lathe. Saves much time in attaching and removing chucks and plates, and holds them rigidly to the spindle.

talk to your Cost Department

● You've got your job cut out for you, when you get the go-ahead on peacetime production. We can't help you on raw material costs or wage rates. But we can show you how modern Monarch turning machines will deliver more perfectly finished parts from your raw material—and how you can turn more parts per man-hour.

You can get an idea of how Monarch can do this, from the accompanying pictures. But they are only a start. Our sales engineers can demonstrate many other devices and practical short cuts that have been time-proved on a wide variety of turning work. In the war product program, especially, Monarch lathes have established new timesaving records.

Getting more and better work out of your machine tools is one way to make your products available to more people at lower cost. It's a necessary step toward American industry's peacetime goal—to permit American workers to earn more, buy more, have more.

For this cost-reducing assistance, ask our nearest branch office or sales agency.

THE MONARCH MACHINE TOOL COMPANY • SIDNEY, OHIO

DIRECT FACTORY BRANCHES

CHICAGO 6, ILLINOIS
622 W. Washington Blvd.
Phone: Randolph 4295

DETROIT 2, MICHIGAN
801 Fisher Building
Phone: Trinity 1-0426

NEWARK 2, NEW JERSEY
635 Industrial Office Bldg.
Phone: Mitchell 2-1770

CLEVELAND 6, OHIO
Room 209 Upper Carnegie Bldg.
10465 Carnegie Avenue
Phone: Garfield 2590

INDIANAPOLIS, INDIANA
Maco Building
38 and College Avenue
Phone: Wabash 2650

PITTSBURGH 22, PENNSYLVANIA
512 Empire Building
Liberty Ave. and Stanwix St.
Phone: Atlantic 6428

Representatives in Principal Cities

Monarch Saves Time

BEHIND THE SCENES

Tra La, Tra La

■ We're a week ahead of ourselves in dishing out this alleged column, and it may well be that by the time this issue hits your desk, another great angry snow storm has us down in the dumps again. But for the moment we're still all smiles over those two full days of sunshine over the week-end. A young man's fancy can go ahead and turn to thoughts of love, if it wants to, but ours seems to get equally excited about the smell of fresh turned earth, seed catalogs and warm spring sunshine.

This winter has been like hitting your head with a hammer—it's going to feel so nice when it's all over.

Safety Last, Comfort First

■ To show the extremes to which some folks will go to get hurt, take the story we heard the other day via the National Safety Council of the plant where there was a large bone crusher capable of crushing the largest bone into fine particles. In the process, quite a few slivers flew around and the operator was required to wear a cup type goggle for his protection. There are some people who think goggles are heavy, fog up at times, give the wearer a headache and in general are a d— nuisance, but not this guy. The boss thought something looked fishy one day and a closer inspection showed he had no glass in his goggles. Our hero said he found they were a lot lighter and more comfortable that way.

Readership In The Raw

■ For a long time we've been hunting the perfect story to illustrate how influential this here magazine of ours is in the scheme of doing business and now we have it fresh from Harold Rowland, who just came in from a swing through Michigan. It seems that a company up Detroit way decided a few months ago to do a little advertising, and as has become the natural thing to do, they used STEEL. But as a general proposition the president of the company was still very much unsold on the value of advertising.

Well, it was just a few weeks later that this same gentleman was sitting home one evening relaxing before the fireplace, and for the sake of completing the picture, let's have him comfortable in his smoking jacket and old slippers.

"Brrring!" goes the 'phone and on answering he wonders who could possibly be calling from Dayton at this hour. "Is this Mr. So and So?", said a voice, "Well, I'm Mr. Such and Such, president of the Such and Such Co. here in Dayton. I was just sitting here at home reading the new issue of STEEL and saw your advertisement. It's exactly the product we need and I had the telephone operator trace through to get your home number because we would like to place our order for a million of them!"

Yessir, it's the gospel truth, but it still isn't really the perfect story even though it does illustrate the kind of action good advertising can stir up sometimes. The reason it isn't perfect, however, is simply because the Detroit company was booked up and had to turn the order down.

Fair Sex

■ Miss Muriel Arbus of Arbus Machine Tool Sales, New York, brings up a very delicate point of etiquette for the editors. Miss Arbus, as you may have noticed, was mentioned in the February 26 issue under "Men of Industry" in connection with her opening an office to locate machine tools for war plants.

She feels this is indeed a great honor, but believes our readers may get the wrong impression even though she has been doing a man's job now for the past three or four years.

As we go to press, the editors are in a closed session threshing out what to do—call it "People of Industry", "Men and Women of Industry", or just "Folks", but in any event the fair sex must be included some way.

Curiosity

■ We met a fellow the other day and he gave us one of his business cards which we didn't bother to turn over until after he'd left, and then discovered this little message printed on the back:

We have been bawled out, balled up and heeled down; bulldozed, blackjacked, walked on and cheated. Stuck for income tax, per capita tax, city tax, school tax, county tax, state tax, personal tax, surtax, dog tax, syntax, freedom bonds, baby bonds and bonds of matrimony. We have given to the Red Cross, Green Cross, and Double Cross. We have been cussed, discussed, talked to and talked about; robbed, run over, damned, trimmed and ruined. The only reason we're sticking around now is to see what in the H— is coming next!

Paper Conservation

■ If you didn't notice anything different about last week's issue of STEEL, (and we'd almost bet a short beer you didn't) then our latest move to conserve paper is as subtle a success as we hoped. When that big knife on the paper cutter slices into the stack of copies now, the operator comes a quarter-inch closer to his thumb and the result is this slightly smaller size for your favorite magazine. But the main result is that several hundred additional copies can now be printed with the paper saved and that many more plants are now getting STEEL each week. We know you're glad to give up that sliver and we guarantee to repay you with a continuing complete information service on metalworking and metal-producing that tops anything available in the country.

Never Ending Chore

■ One of our statistically minded friends threw this one at us the other day and it's a frightening thought. With slide rule and calculator in hand, he comes up with the horrible fact that a man shaves 20 square miles of face during a lifetime. Ye gads, no wonder there's no time left to do anything else.

Vol. 116, No. 11, March 12, 1945, issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

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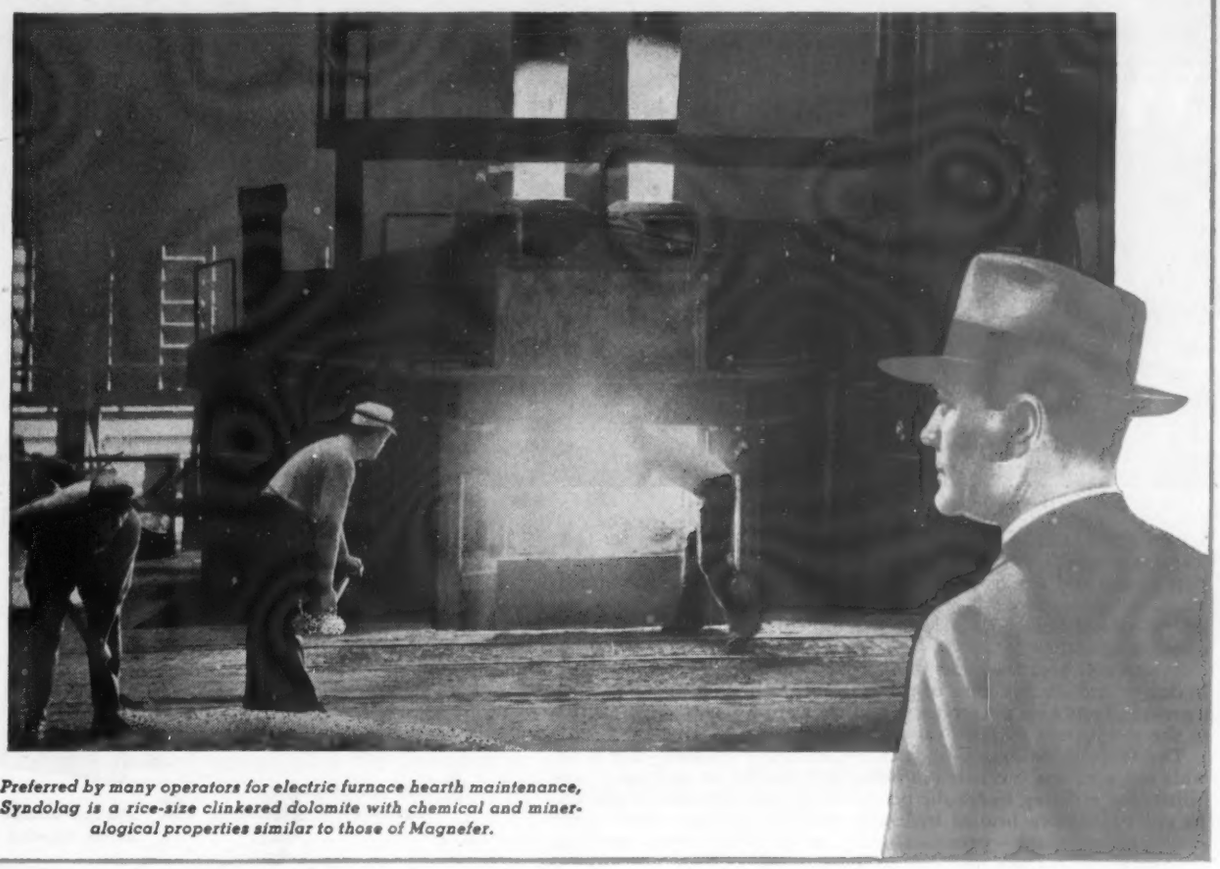


Preferred by many operators for electric furnace hearth maintenance, Syndolag is a rice-size clinkered dolomite with chemical and mineralogical properties similar to those of Magnefer.

"FRIEND IN NEED IS A FRIEND IN DEED"

THE thing that differentiates the Basic Refractories representative from lots of the other men who call on you is that he knows something about your industry and its refractory problems, as well as the products he's selling.

He is more than a salesman, he's a Refractories Engineer. He's a man who has actually made steel. The open hearth and the electric furnace are familiar production tools to him, because he has worked with them "on your side of the fence".

When he talks to you about basic refractories, he can give you *facts,* backed up by personal experience. What's more, you are urged to take advantage of his practical knowledge of methods of application—for building new hearths, making major repairs, or controlling heat-to-heat maintenance. It's his job to see that Basic Refractories products give excellent service in your furnace, and to help you in any other way he can.

There's many a time that a Basic Refractories man has taken off his coat and put on the overalls to help a customer in a tough spot. So think of *your* Basic Sales Engineer as your friend in need, who is a friend in deed, too.

BASIC FURNACE REFRACTORIES

BASIC REFRACTORIES, INCORPORATED 845 HANNA BUILDING *Cleveland 15, Ohio*

WARTIME metal-working methods FORECAST PEACETIME advances

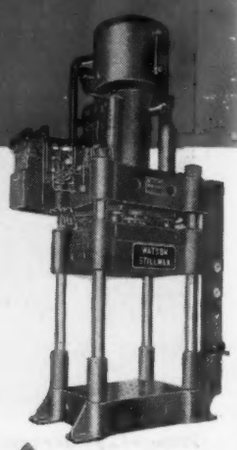
NEW HYDRAULIC PRESSES developed by Watson-Stillman for fast forming of shells, bombs, airplane propeller domes and fuel tanks, ship plates, and similar products vital to the war effort has added much valuable experience to an already broad "know-how" in designing and building hydraulic equipment for all kinds of metal-forming operations.

Substantial improvements that have been made by W-S engineers in design and construction of presses, and controls are sure to have a great influence on the economy and wide application of hydraulics in the production of post-war metal products.

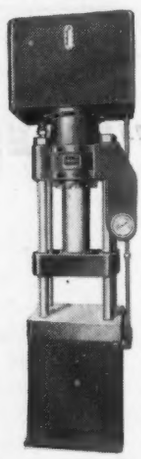
The Watson-Stillman Company is fortunately situated—due to its wide scope of war business—in being well posted on postwar possibilities for utilizing hydraulic presses of standard or special design. Its comprehensive line of hydraulic forming presses—built since Pearl Harbor alone—promises wider, more varied metal-working benefits to all major industries in the postwar period.

Only a few of the many available types and sizes of latest W-S Forming Presses are shown here. Write for detailed information on these and other W-S hydraulic presses for forming, forging, flanging, straightening, shearing, bending, piercing, nosing, assembling and other metal-working operations. The Watson-Stillman Company, Roselle, N. J.

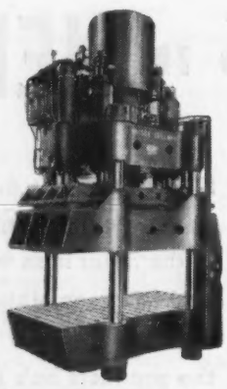
200-Ton Single Action Forming Press



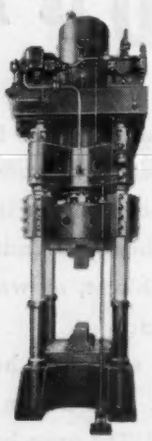
300-Ton Double Action Forming Press



75-Ton Utility Press



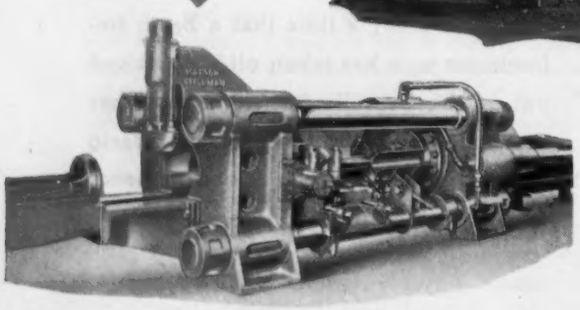
800-Ton Double Action Forming Press



500-Ton Forging Press

4500-Ton Rubber Pad Forming Press

1000-Ton Extrusion Press



WATSON-STILLMAN

Designers and manufacturers of Hydraulic Equipment, Forged Steel Fittings and Valves.

WHERE LIMITED STORAGE SPACE NECESSITATES *High Piling*

● Getting the most out of small store yard space or handling heavy loads in concentrated areas at loading or unloading points calls for versatility in material handling machinery. These are the places for Northwest Crawler Cranes. Northwest Crawler Cranes handle jobs that no other type of material handling equipment can handle.

Northwests go anywhere. They pile high or low. They handle any type of material handling attachment from Hook Block to Magnet. They will unload any type of material. They can be adapted to unload practically any type of conveyance and they can be equipped to work inside or outside and with any modern form of power.

Northwests are serving in the plants of some of the Nation's largest manufacturers handling everything from coal and ashes at the power plant to steel and scrap in the store yard. Your Northwest will always be busy cutting costs in ways you never dreamed of. Let us tell you in detail how others are using them. Ask for details on Northwest advantages and Northwest application.

NORTHWEST ENGINEERING CO.
1805 Steger Bldg., 28 E. Jackson Blvd.
Chicago 4, Illinois

OTHER THINGS A NORTHWEST WILL DO!

- Handle coal and ashes.
- Load and unload any kind of conveyance.
- Handle any type of material, loose or solid.
- Handle magnet for scrap, turnings and borings.
- Goes any place to make out-of-the-way corners of the yard usable.

BUILT IN A RANGE OF 18 SIZES — 4½ TONS CAPACITY AND LARGER

Let's get acquainted INVESTIGATE THIS *Different* CRAWLER CRANE

NORTHWEST

The Crane that goes Anywhere!

What About HAMMERS?

HOW ARE THESE ERIE HAMMERS BEST USED IN FORGING PRACTICE?

1 Can you guess the capacity of this Erie Hammer?

2 Can you identify this Erie and tell where its use is most effective?

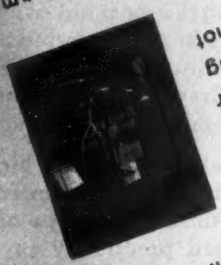
3 Can you identify this Erie Hammer and recognize its application to a definite class of forging work?

4 Can we help you on your specific forging equipment need now?

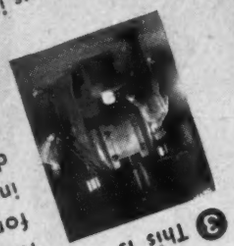
HERE THEY ARE IN FORGING OPERATION

1 A 35,000 lb. Erie Steam Hammer forging aircraft parts in this illustration.

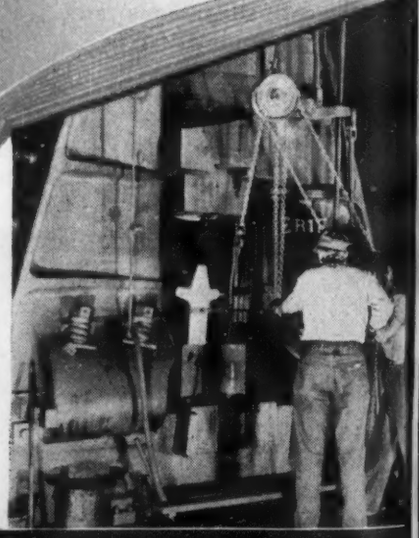
2 A 7500 lb. Erie four Roll Board Drop Hammer most effective for making drop forgings that do not require fullering.



3 This is a 1500 lb. Erie Single Frame Hammer, steam operated for general blacksmithing work in the forging department of a large manufacturer of heavy machinery.



4 Write us in detail, and we shall try.



ARMY E NAVY

ERIE

● WRITE FOR BULLETINS ON ERIE HAMMERS AND TRIMMING PRESSES

ERIE FOUNDRY COMPANY

ERIE, PENNSYLVANIA

ERIE BUILDS *Dependable* HAMMERS

Every Belt a Specialist

In Allis-Chalmers' Great New V-Belt Line!

When Allis-Chalmers recommends a certain belt for a certain job, you can be sure it's the *right* belt. Because: 1) the Texrope line is *complete;* 2) Allis-Chalmers invented the multiple V-belt drive, offers engineering advice based on unparalleled experience. Both sound reasons for making Allis-Chalmers your "V-Belt Drive Headquarters."

1

HEAT-RESISTING SUPER-7, made of Buna-S synthetic rubber, has ability to withstand heat built right into it. Standard Super-7 belt, it can successfully operate in ambient temperatures up to 180 degrees F.

2

OIL-RESISTING SUPER-7 specializes in operating under fairly bad oil conditions. Neoprene, a synthetic impervious to oil, grease, other grimy liquids, is the cover for the regular Buna-S Texrope V-belt core.

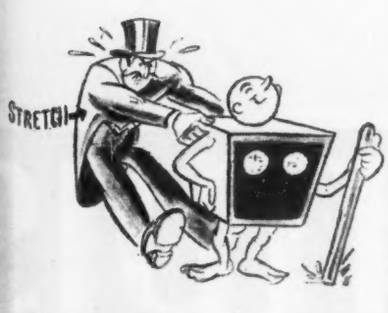
3

OIL-PROOF SUPER-7 is made of solid Neoprene, which is unaffected by most rubber-attacking liquids. It is recommended for drive installations where V-belts are virtually swimming in oil or grease.

4

STATIC-RESISTING SUPER-7 conducts static charge to machine to ground it. Static conducting element is contained throughout belt cover — can't wear off. This belt is used where explosion danger is present.

♪ *Tune in the Boston Symphony, Blue Network, every Sat. Eve.*



5

SUPER-7-STEEL employs endless cables of steel to reduce belt-stretch, provide greater horsepower. It is used where V-belt drive centers are hard to adjust, loads to be driven are extra heavy, space is limited.

A 1731

It pays to make

ALLIS-CHALMERS

your

V-BELT DRIVE HEADQUARTERS

Texrope Super-7 V-Belts result from the cooperative research of two great companies—Allis-Chalmers and B. F Goodrich—and are sold exclusively by A-C.

16

Single pulley ...t-contai... and bearings · ...e pump... disconnecting ...ing · ... opens and ...omatico... by inner walls ...imum d... guides through ...ds in car... giving fly-whee...t, facili...

THE LANDIS CHASER

The finest thread cutting tool in industry.

The many new and exclusive features of LANDMACO... Threading machines combine t... assure the greatest possibl... degree of accuracy, ease o... operation and flexibility in mak... ing set-up changes.

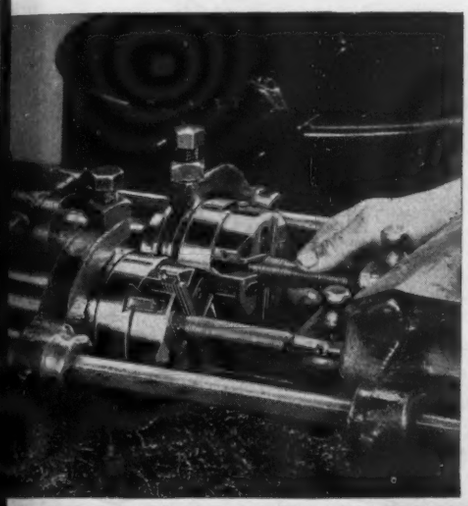
LANDIS

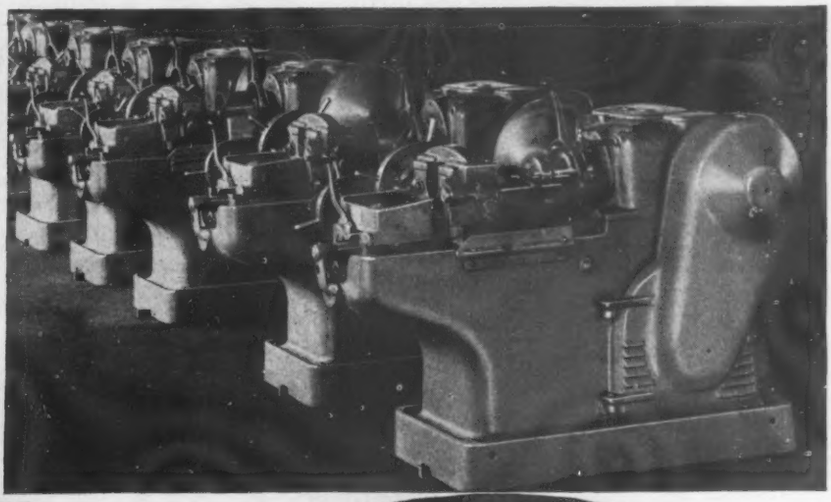
THREADING MACHINERY • THREAD CUTTING DIE HEADS

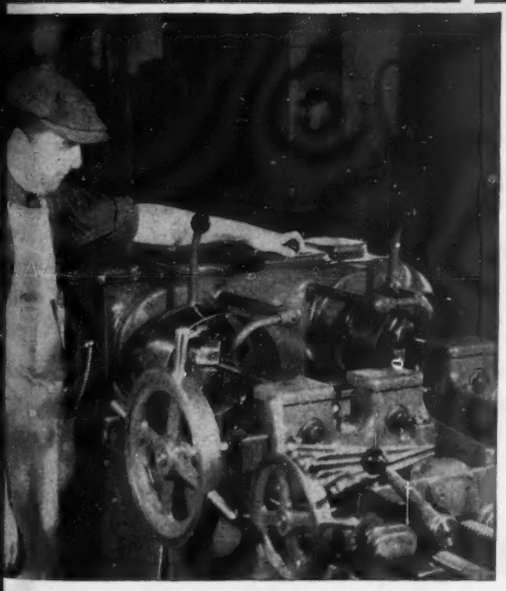
Reasons for the Superiority of

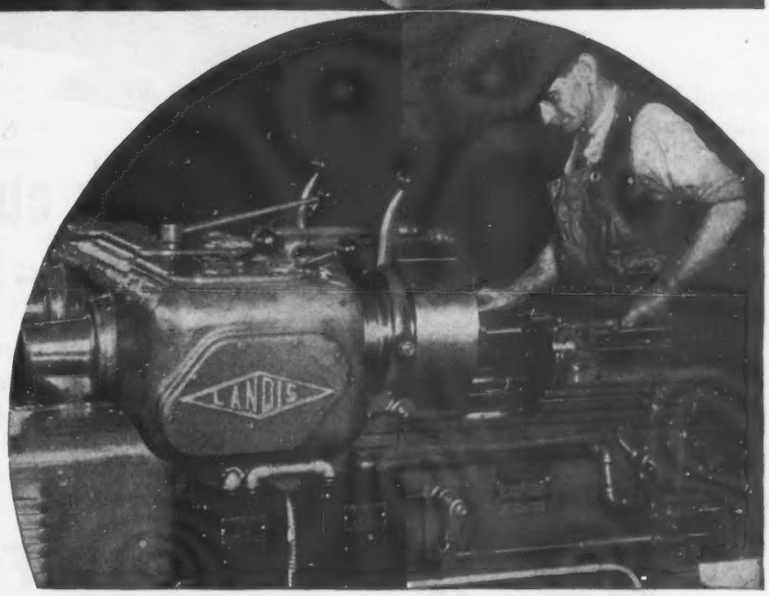
LANDMACO THREADING MACHINES

Self-contained selective type gear box provides eight spindle speeds • Flood lubrication for all gears • Oil pump direct driven and automatically reversible • Built-in pump can be removed without stopping • Motor-in-base affords compact and efficient motor drive • Friction clutch control • Head opens automatically • Hand lever for opening and closing head • Semi-steel bed of box type reinforced • Minimum die head overhang • Adjustable vise easily lined up with spindle • Oil reservoir lubricates ways in carriage base • Gibbed carriage compensates for wear • The heavy rim of vise hand-wheel, sheet, facilitates gripping of work • Guards completely cover and protect guides









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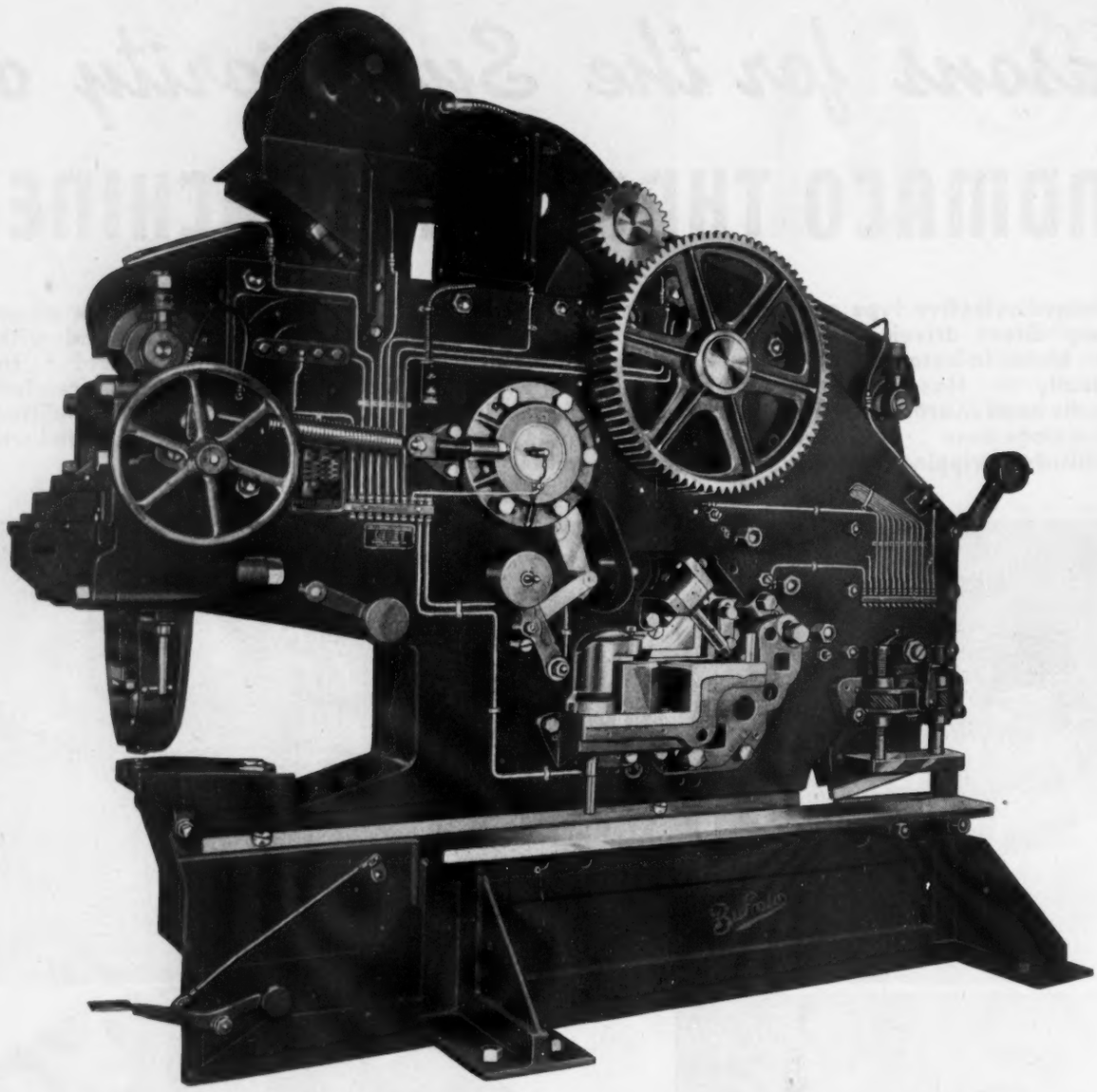
COLLAPSIBLE TAPS • PIPE THREADING AND CUTTING MACHINES



Punches 1 9/16" x 1 1/4"; cuts 6" x 7/8" Angles, 3" Rounds, 2 5/8" Squares - Shears 1 1/4" Plates

. . . Where work like that listed above is to be done, the Buffalo No. 4½ U.D. Machine shown here is the answer. Steel shops, railroad maintenance shops, steel mills and many other heavy industry shops find that Buffalo U.D. Machines speed up their production greatly.

COMPLETE DETAILS CONTAINED IN BULLETIN 360A

"Buffalo"

BUFFALO FORGE COMPANY

158 MORTIMER STREET BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

COMBINATION PUNCHES
Shears and Bar Cutters

Bridge structures like this, and many other types equally modern, will be needed to carry the giant, fast trains in the peacetime era. American Bridge Company stands supreme in its capacity to fabricate and erect them or any other needed railroad structure, from turntables to buildings.

A glimpse into the future while your eyes are on the present

NEVER in their history have America's railroads faced a test to match that of this war emergency. Never have they more completely demonstrated their ability to accomplish the seemingly impossible.

The entire operation has been precedent-breaking. Troops, civilians, raw materials and finished products have been moved in numbers and volume with incredible speed and dispatch.

The job is by no means through. It must continue as long as war lasts despite increasing wear and tear on equipment and serious shortages in man power. The utmost is still asked and the carriers have proved that they can and will give it.

Every railroad man knows what high speeds, great loads and ceaselessly pounding traffic does to equipment, roadbeds and structures. That these have stood up and will continue to do so is a monument to foresight, unceasing vigilance and well engineered upkeep and repairs.

But no railroad man, either, doubts for a moment that the future calls for great planning. One glimpse is all that is needed to see that a vast rehabilitation program is inevitable. America, alert to wartime achievements, will demand in peacetime competition a continuance of exceptional service with even greater assurance of speed, comfort and safety. This means changes and improvements in everything from roadbeds to equipment. It means old structures modernized and strengthened, new and better ones built. It means profiting by technological advances in materials and equipment.

When that welcome time arrives, and it may not be long in coming, we, too, will be able to put aside our war job and take on the tasks of peace. Then you will find American Bridge Company better able than ever to help you; ready with unsurpassed facilities, with greater-than-ever resources and experience, to tackle your every structural problem.

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

District Offices in: Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit
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Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Export Company, New York

UNITED STATES STEEL

Look to Peninsular for

Continued Leadership

in grinding wheel progress

ANYONE who is interested in keeping abreast of the newest grinding developments will want to devote some of his time to Peninsular. For not only has Peninsular manufactured abrasive wheels of the highest quality since 1889, but from Peninsular have come many of the basic advancements of permanent worth.

In the manufacture of steel and other heavy industries, for example, Peninsular has won an enviable reputation for speeding production and greatly reducing production costs.

Peninsular's pioneering efforts have not been confined to the fabrication of abrasive wheels alone. They include new methods for their application to modern industrial problems—new machinery for their manufacture — new standards of service in connection with their use.

As our nation steps up production of war materiel in our final drive for victory—as we look forward to reconversion to peacetime manufacture—look to Peninsular for continued leadership in grinding wheel advancements.

A STANDING INVITATION

Our expert staff of factory and field engineers are ready today to help in your preparation for regular production—with an engineering and cost analysis service beyond any offered up to now in industry.

The Peninsular Grinding Wheel Company, 729 Meldrum Ave., Detroit 7. *Branches:* Philadelphia, Chicago, Cleveland, Newark, Pittsburgh.

SPECIALISTS IN RESINOID BONDED WHEELS

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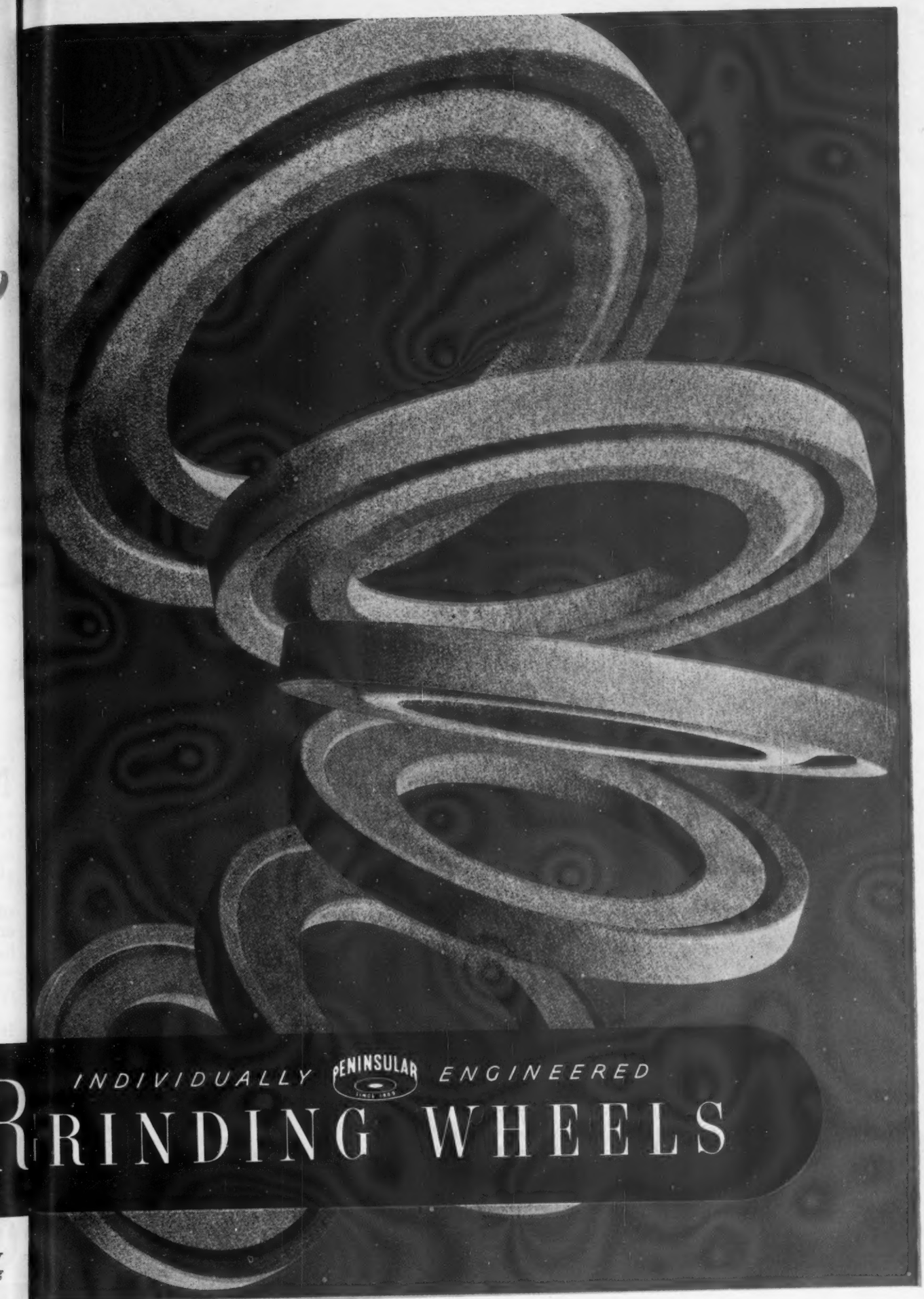
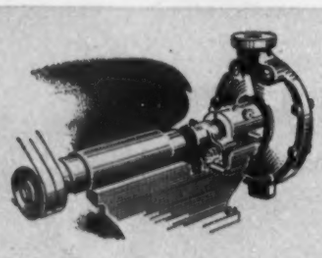
SINCE 1889

Special Wheels for Shoulder Grinding

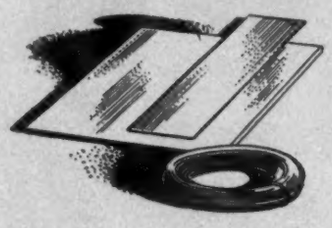

INDIVIDUALLY PENINSULAR ENGINEERED
RINDING WHEELS

For the Tough Jobs use H

Properties of HAYNES STELLITE Alloys	Average Tensile Strength, psi	Average Hardness, Rockwell	Melting Point, Deg. F	Can be Forged	Can be Rolled	Re Oxida at Hi Tem
HAYNES STELLITE Cobalt-Base Alloys						
1	47,000	C54	2,282	No	No	Excell
6 Cast	105,000	C40	2,327	Yes	Yes	Excell
Rolled	130,000	C40 to C46				
12	76,000	C48	2,306	No	No	Excell
Star J-Metal	65,000	C61	2,318	No	No	Excell
98M2	63,000	C62	2,250	No	No	Excell
HASTELLOY Nickel-Base Alloys						
B Cast	80,000	B96	2,440	Yes	Yes	Fair
Rolled	135,000	B98				
C Cast	76,000	B93	2,350	No	Yes	Excell
Rolled	120,000	B90				
D Cast	38,000	C53	2,040	No	No	Fair
HAYSTELLITE Tungsten-Base Alloys	—	Between 9 and 10 Moh's Scale	—	No	No	—
HASCROME Iron-Base Rod	40,000	C40-50 after peening	—	Yes	Yes	Fair

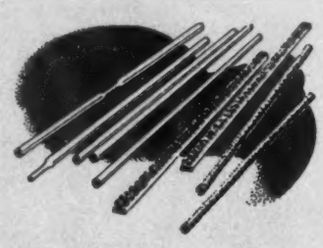


Castings . . . A wide range of castings can be supplied in:
- HAYNES STELLITE Alloys 6, Star J-Metal, 98M2, 93
- HASTELLOY Alloys B, C, D
- HAYSTELLITE Tungsten-Base Alloys



Rolled Forms . . . Sheets and plates are made from:
- HAYNES STELLITE Alloy 6
- HASTELLOY Alloys B, C

Hot-rolled bars are supplied in:
- HASTELLOY Alloy B



Welding Rods . . . for applying a wear- and corrosion-resistant alloy coating to other metals:
- HAYNES STELLITE Alloys 1, 6, 12
- HASTELLOY Alloys B, C, D
- HAYSTELLITE Alloys
- HASCROME Rod

HAYNES STELLITE Alloys

Resistance to Corrosion		
Oxidation at High Temp.	Sulphuric Acid	Hydrochloric Acid
Excellent	Fair	Fair
Excellent	Fair	Fair
Excellent	Fair	Fair
Excellent	Fair	Fair
Excellent	Fair	Fair
Fair	Good	Excellent
Excellent	Good	Good
Fair	Excellent	Fair
—	—	—
Fair	—	—

Available in a wide range of properties and forms to resist wear, corrosion, and heat . . .

HAYNES STELLITE alloys are specially made to meet the requirements of industry's most difficult applications. They are hard, tough, and heat-resistant and are used for those parts of equipment and machines that are most subject to wear and corrosion. The chart at the left describes some of these alloys and their significant properties. Sketched below are some of the forms in which they can be furnished.

For further information, write for the booklet, "Properties of HAYNES STELLITE Alloys."

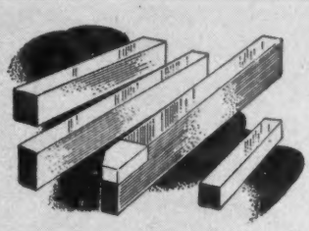
HAYNES STELLITE COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

General Office and Works, Kokomo, Ind.

Chicago—Cleveland—Detroit—Houston—Los Angeles—New York—San Francisco—Tulsa



Metal-Cutting Tools . . . made from HAYNES STELLITE Alloys, known for their red hardness. These tools take heavy cuts at high speeds and coarse feeds—with long life between grinds:

HAYNES STELLITE Star J-Metal
HAYNES STELLITE Alloy 98M2

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Bright Hardening-

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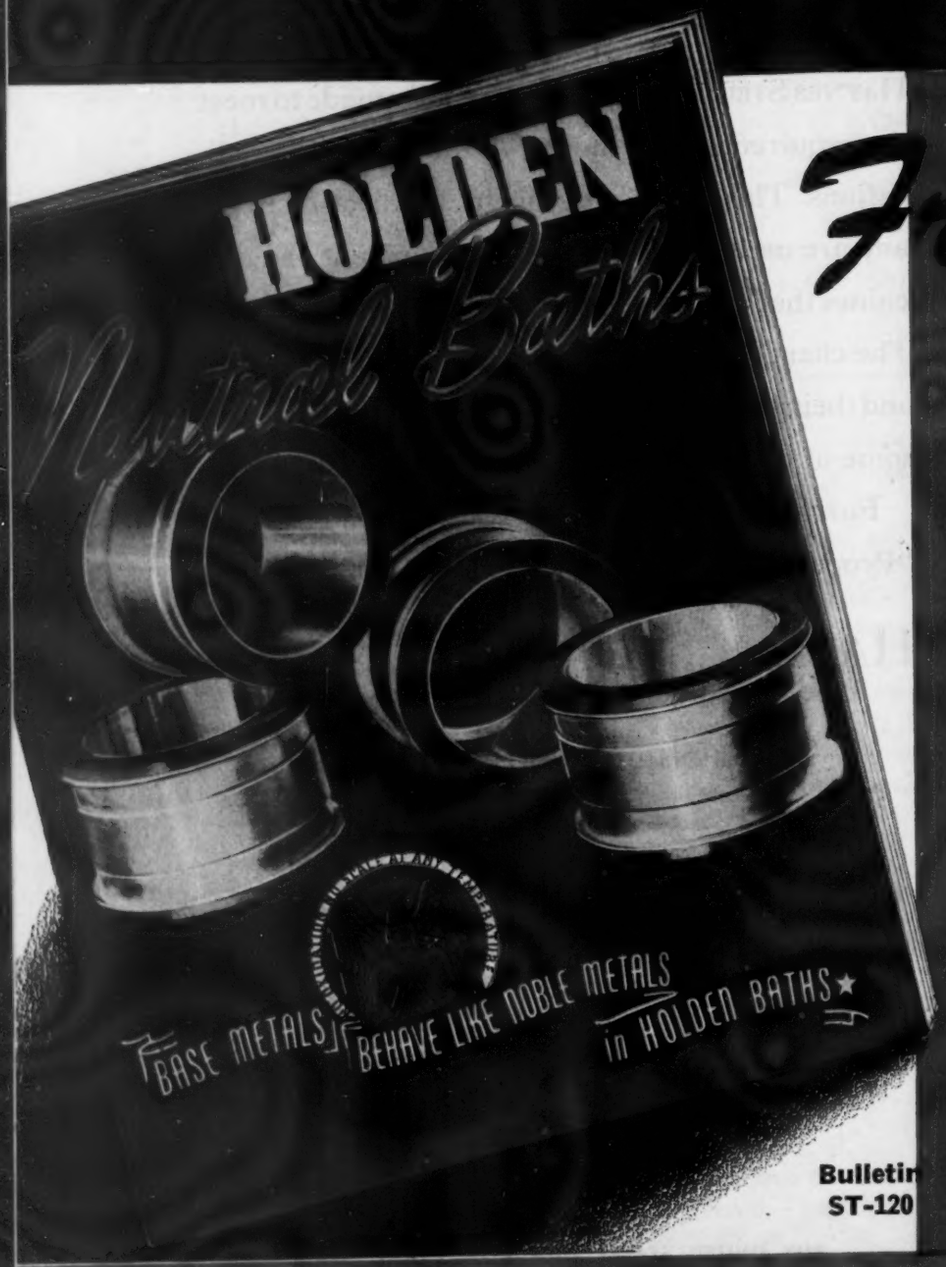

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Typical Furnace Installations
High Speed Hardening
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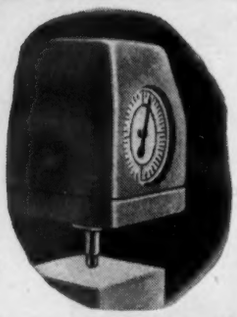
nothing *is more highly specialized than* ALLOYS



WITH RUBBER, GLASS, PLASTICS, fibers, light metals—we have entered on a period of such specialization of materials as was never before known. And nowhere are compositions and processes more minutely differentiated than in the metallurgy of iron and steel.

Specialization in this field means more use and more discriminating use of alloying elements. It means adaptation and exact control of processes. Thousandths of one per cent of such an element as Boron, or some other minute variation of formula, or a few degrees of temperature, perhaps, even in the higher ranges of heat treating, may greatly affect the useful properties of the resulting iron or steel. Economical and successful production depends on the scientist and the technician as never before.

As a leading supplier of Molybdenum, Tungsten, and Boron in their various forms, the Molybdenum Corporation has prepared helpful information and advice on the most advanced applications of these three much-discussed elements. Inquiries are welcomed.

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GRANT BUILDING PITTSBURGH, PA.

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THE PRODUCTION-PROVED* WELDING MACHINE IS THE MACHINE FOR YOU

*(Production-proved on critically needed Bomb bay doors for airplanes.) We make no claims to be winning the war. But our welding machines are doing some amazing war work and continuous welding. One example is the work on Bomb Bay doors for airplanes. We think you'll agree that production-proved Ergolyte machines are made to order for your work. And we mean made-to-order literally. The Ergolyte Welder is actually engineered and constructed to your requirements, combining such features as six coil design, plug-in or stepless current adjustment, high cycle device, air cooling. Many others. Keep up to date with Ergolyte. Send coupon for complete information on Ergolyte machines and performance. *Note*: We can make prompt deliveries now.

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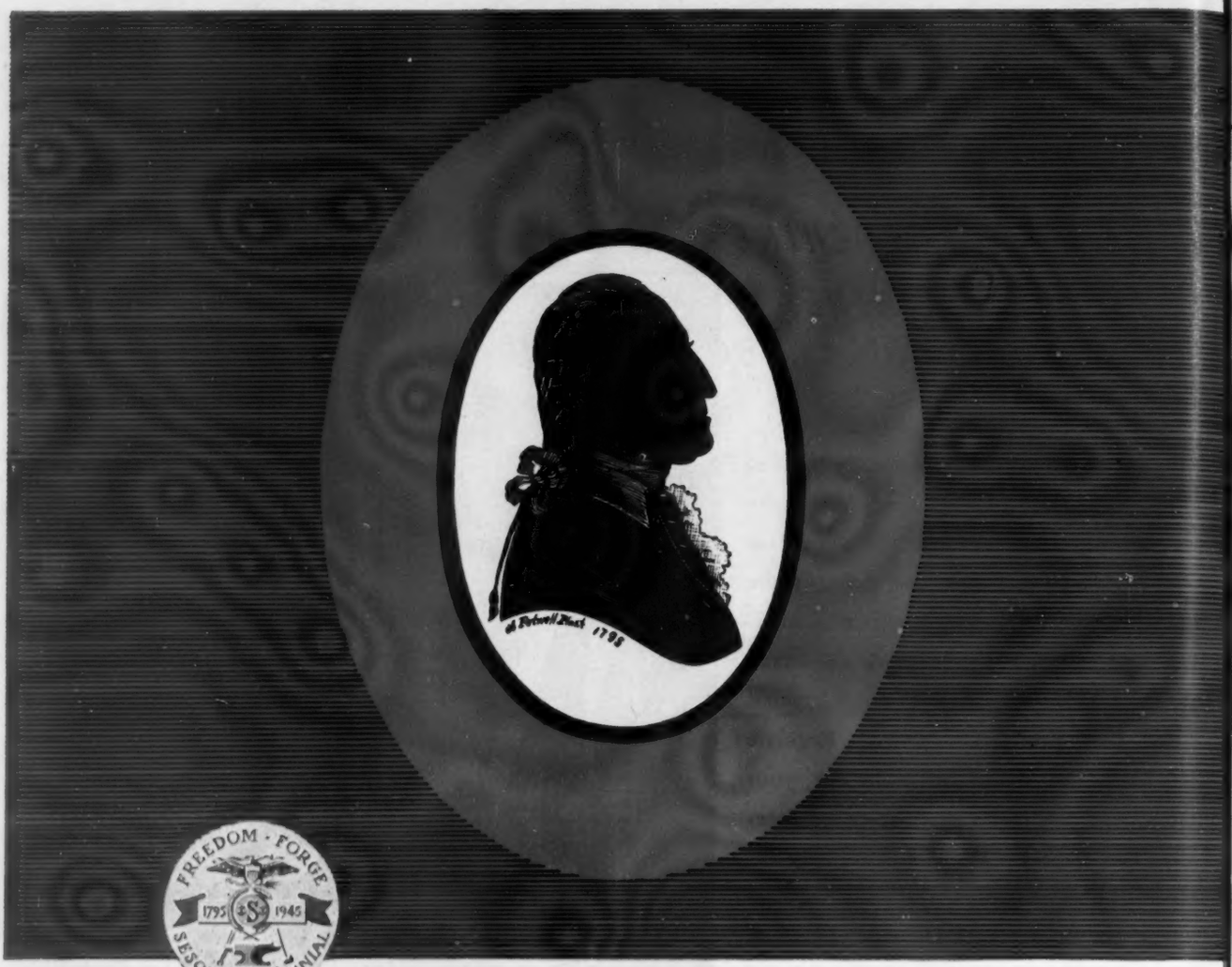

In 1795

When *Washington* was president "Standard Steel"

forged the first link in a chain of service 150 years long

There were only 15 states then and the fourth congress was sitting, back midway in Washington's second term. But it's amazing the many things that happened which directly affect America's life today.

General Wayne concluded a treaty with twelve Indian tribes, obtaining 25,000 square miles of land that later became southeastern Indiana and southern Ohio. Connecticut sold the balance of the Western Reserve, which made up still more of what was to be the Buckeye State. A day of Thanksgiving was appointed by statute, and a new naturalization act was passed, requiring five years' residence, and the renunciation of all allegiance to foreign sovereigns, and all claim to titles of nobility. Then, too, the infant republic got another infant industry . . . *Freedom Forge.*

Today, a direct descendent of Freedom Forge—Baldwin's Burnham plant, still in the same location after 150 years—still serves America with castings and forgings that reflect a century and a half of continuous progress and pioneering. In every generation, "Standardize on Standard" has been a dependable short-cut to assured satisfaction. The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pennsylvania, U. S. A. Offices: Philadelphia, New York, Chicago, Washington, Boston, Cleveland, St. Louis, San Francisco, Houston, Pittsburgh, Detroit.

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You'll be amazed, too, at how *economically*, *quickly* and *easily* you can give zinc or cadmium products this all-out protection. Apply Iridite by brief, simple dipping after the last rinse tank in your plating line. It dries in a few seconds, permitting immediate handling and shipping.

Iridite figures widely in military and industrial specifications, both as final finish and paint base. As a final finish, its wide range of colors make products attractive to look at—and buy. As a paint base, it takes paint at once and holds it permanently.

If you're making—or planning to make—cadmium plated or zinc die cast, plated or galvanized products, you ought to know how Iridite can help you sell them. Attached coupon will bring you test panel and full information. Mail it now.

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- Hot-water rinse makes drying *still faster.*
- You can *handle* or *ship* as soon as dry.
- You need *no* special personnel.
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- You maintain your *automatic machine cycles.*

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Gentlemen: Please send me a free test panel of Iridite-treated zinc plate. Also full information and operating details.

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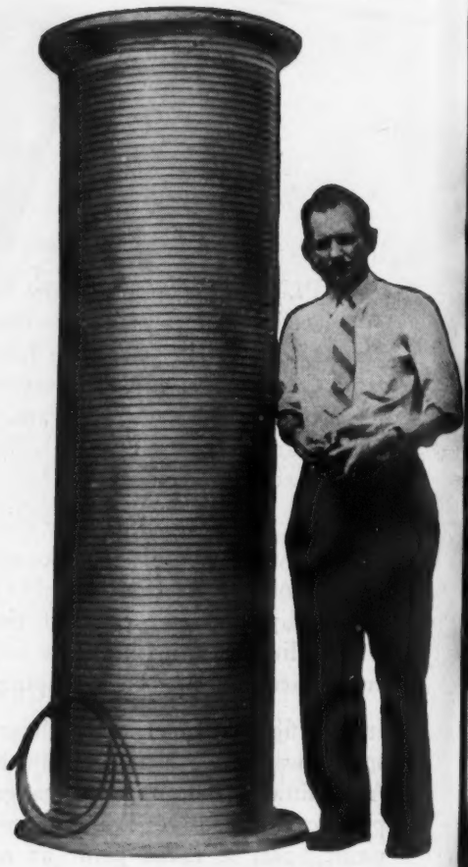
PENFLEX Interlocked construction resists pulsations of load and pressure, absorbs vibration, prevents metal fatigue. PENFLEX Interlocked construction provides the flexibility to make quick, easy installations. PENFLEX Interlocked construction with asbestos packing gives you a pressure-tight, trouble-free exhaust connection. PENFLEX 24" Interlocked, the largest hose in the PENFLEX line, has a bending radius of approximately seven times its diameter and a working pressure of 15 to 25 psi. PENFLEX Interlocked construction requires no special tools or heat to bend.



Complete range of sizes from 5/32" I.D. to 24" I.D.

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Hose and Tubing is also available for other flexible connections on Diesel Installations.

PENFLEXWELD
for Fuel Oil and Starting Air.

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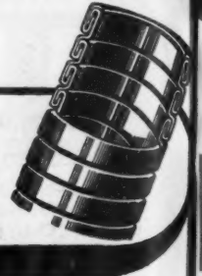

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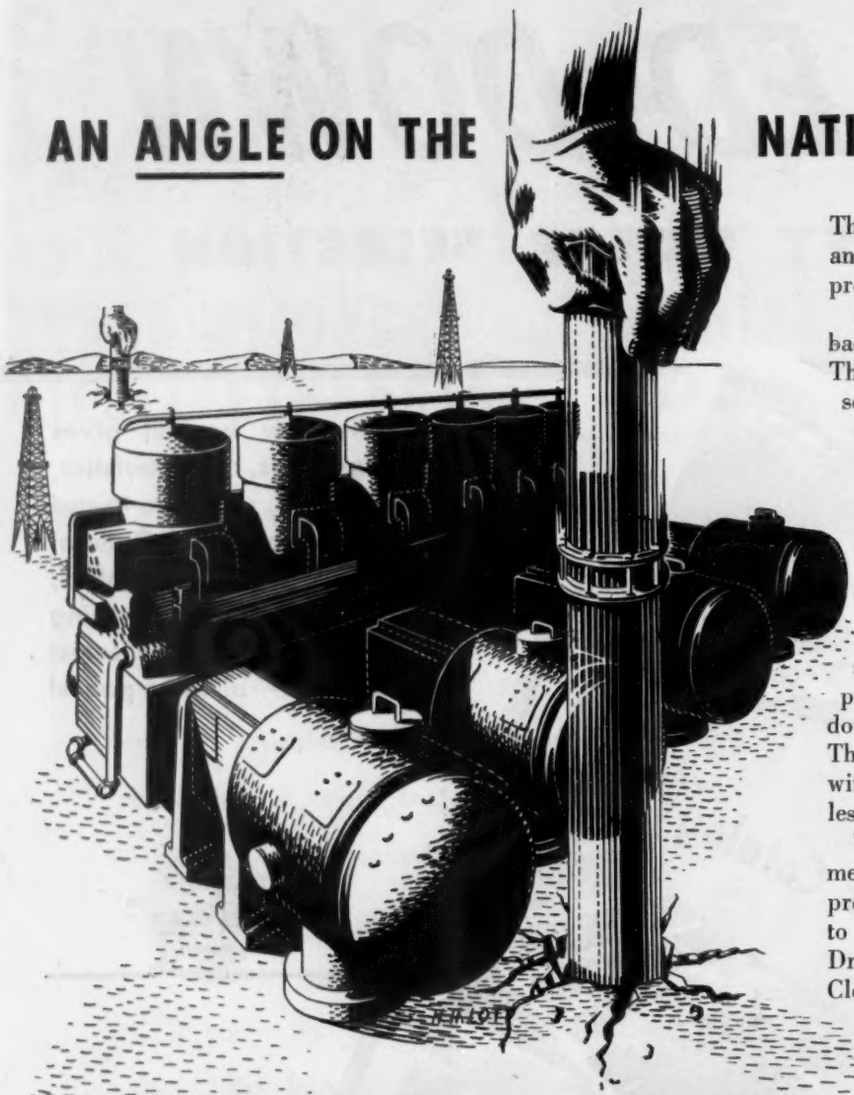
AN ANGLE ON THE NATION'S OIL CURVE



This compressor is one means of putting an upswing in the curve of America's oil production.

It returns natural gas produced with oil back into the well under tremendous pressure. The gas puts pressure on the oil underground, squeezing the maximum output. Oilmen call this repressuring.

Early compressors used to spread out over expensive foundations and were built bigger and bigger as they had more work to do. Clark re-engineered, standing half the engine upright at right angle to the rest. This "Angle" engine saves half the weight, half the floor space. Clark went further. The power output of the Clark 2-Cycle engine is about double that of a 4-Cycle of similar dimensions. The Clark "Angle" is faster and smoother with lower continuous fuel consumption and less wear.

The over-all economy of this Clark "Angle" means more wells now can be repressured profitably. This is an important contribution to the nation's oil reserves by a member of Dresser Industries, Inc., Terminal Tower, Cleveland 13, Ohio.

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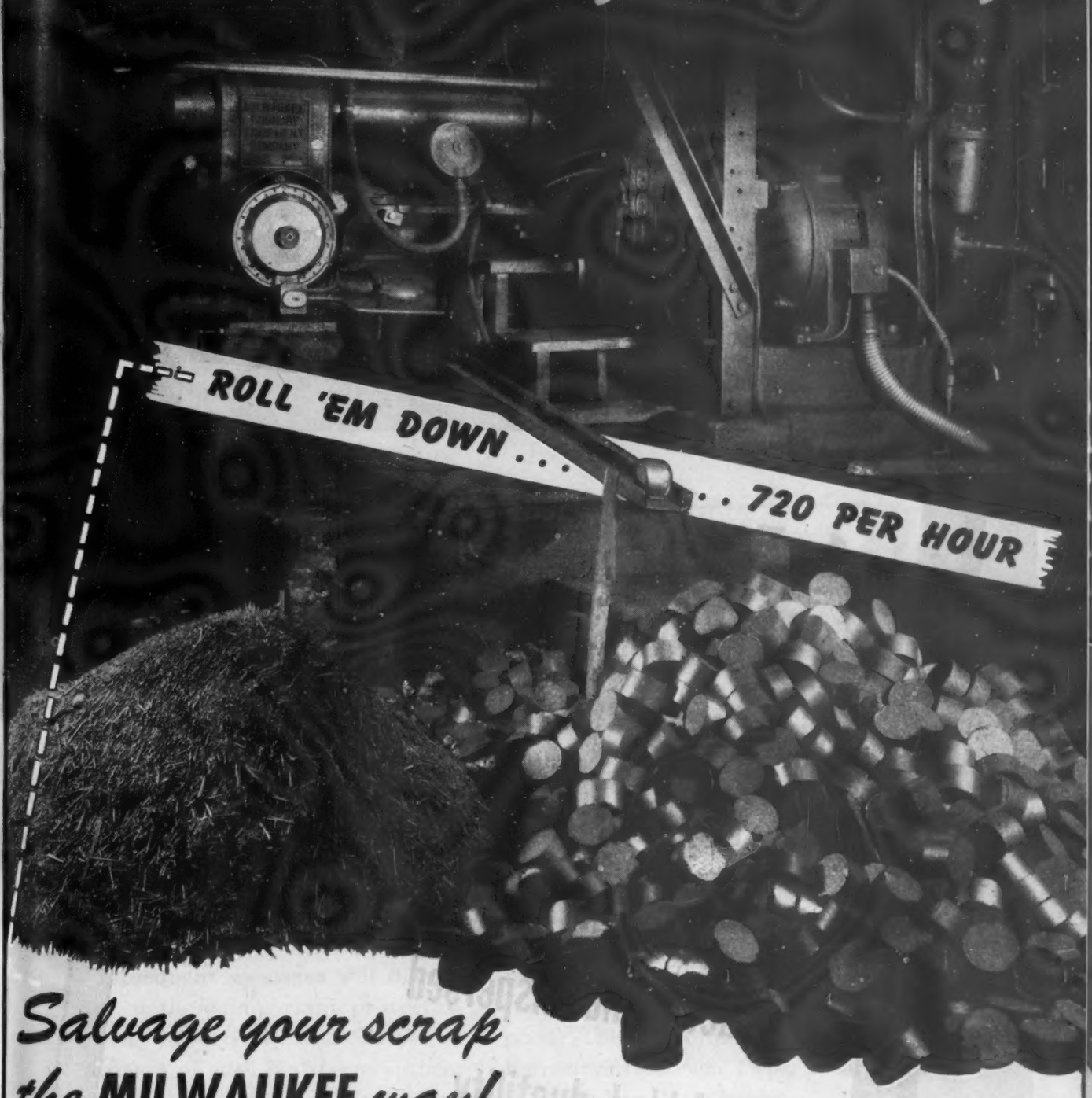


Salvage your scrap the MILWAUKEE way!

● Metal removed by milling, turning, facing and other machining operations can be quickly converted into compact briquettes by using a Milwaukee Hydraulic Press. Capacity up to 720 briquettes per hour. Enables you to reclaim the highest percentage of materials, affords better metal control and effects substantial savings in melting costs.

COMPENSATE FOR WAR LOSSES

Conservation of basic materials such as brass, bronze, aluminum, magnesium, cast iron or steel is, of course, important today. But it will be even more important after this destructive War comes to an end. So check salvaging opportunities in YOUR plant as they exist today. Our engineers will gladly assist you.

MILWAUKEE Foundry Equipment Co.

3238 W. PIERCE STREET, MILWAUKEE 4, WISCONSIN, U.S.A.

"FERRO

1. Thorough deoxidation
2. Inclusions reduced—uniformly distributed—stringers eliminated
3. Prolonged increase in fluidity
4. In fine-grained steel—inclusions reduced and dispersed
5. Added ductility
6. Increased hardenability

CARBO"-S

Used as a ladle addition for various kinds of steel, "FERROCARBO"-S is consistent in securing the improvements listed. It is so effective in stringer reduction and inclusion dispersion that ingot quality is improved and Magnaflux quality is normal in "FERROCARBO"-S treated steels.

▶ Subsequent messages will discuss each of these important properties gained through "FERROCARBO"-S treatment of steel. In the meantime, our metallurgical staff will be glad to provide you with individual information on the use of this product in your plant. The Carborundum Company, Refractories Division, Department R2, Perth Amboy, New Jersey.

"FERROCARBO" distributors are:
KERCHNER, MARSHALL & CO., Pittsburgh, Cleveland and Birmingham
MILLER & COMPANY, Chicago, St. Louis and Cincinnati

RBORUNDUM" and "FERROCARBO" are registered trademarks of, and indicate manufacture by, The Carborundum Company.

Ferrocarbo by CARBORUNDUM
TRADE MARK

KONDOR DRAW

FOR FASTER, EASIER METAL DRAWING

KONDOR DRAW is solving the drawing problems of hundreds of plants.

KONDOR DRAW will solve your problems as it did on this job.

HERE WAS THE TROUBLE

Breakage at the 2 inch depth, extending horizontally across the entire 2 inch end.

Size: Base—5" long. One end—1¾" deep; other end—½" deep. Top—2" wide one end, tapering to point on the ½" depth.

MATERIAL

.050" brass strip stock.

OPERATION

Single draw from developed blank as shown in unretouched illustration.

ANALYSIS OF TROUBLE

Lower pressures caused excessive metal flow and wrinkling. Higher pressures resulted in immediate breakage.

SOLUTION OF TROUBLE

To find a lubricant that would flow metal at tapered end and prevent flowing at shallow end without resulting wrinkling and breakage.

RESULTS WITH KONDOR DRAW

With no change in procedure, wrinkling and breakage were completely eliminated with no pick up or scratching.

Call a Kondor engineer today.

WRITE TODAY FOR FREE SAMPLE

6th OF A SERIES

KONDOR PRODUCTS

CORPORATION

INDUSTRIAL PROCESSING CHEMICALS

WEST CLIFTON BLVD. AT SLOANE . CLEVELAND 7, OHIO

50 Church St., New York 7, New York

District Offices: ATLANTA (3): 1001 Glenn Bldg.—BOSTON (16): 900 Statler Office Bldg.—DETROIT (2): 405 Blvd. Bldg.—CHICAGO (4): 35 W. Washington St.—NEW YORK (17): Export Office, 545 Fifth Ave.—PHILADELPHIA: 5941 Alma St.—DALLAS (8): 404 E. 8th St.—SAN FRANCISCO: 547 Howard Street—LOS ANGELES (26): 1812 W. Sliverlake Drive.

Canadian Associates: ALLIED INDUSTRIAL EQUIPMENT CO., 108 River St., Zone 1 TORONTO, ONT. MONTREAL, QUE.: 366 Ontario St., W.—VANCOUVER, B. C.: 841 W. Broadway

Ohio Corporation Expanding Rapidly

One of the fastest growths in recent business history has been experienced by the Kondor Products Corporation of Cleveland, Ohio. In less than a year this corporation has expanded until now it has ten branches in all the key industrial centers of the United States and three in Canada.

The corporation manufactures various products for use in drawing, forming and pressing metals and also cleaning and rust proofing compounds. Their Kondor Draw has been a revelation to designers, engineers, production men and "trouble shooters" in eliminating or minimizing rejections of metal due to lack of deep drawing physical properties.

This product operates equally well for both ferrous and non-ferrous metals. If a part can be drawn at all, Kondor Draw will draw it. E. D. Viers, president of the corporation, states that manufacturers are unable to understand, until they try Kondor Draw, the multiplicity of jobs it will do.

Kondor Draw permits the deep drawing of parts heretofore thought impossible, such as steel burster tubes, shell cases, extremely thin metals, and designs having a very sharp radius, with few if any anneals. On many war jobs now in progress, steel which had been rejected as unsuitable for drawing and draw press operations, is now being drawn with Kondor Draw with a minimum of breakage and in most cases no breakage at all. From ten to fifteen percent less pressure is required with Kondor Draw than in other drawing compounds. Wrinkling, scoring and excessive breakage have been eliminated on many difficult jobs through the use of this remarkable lubricant. An absolute minimum of die wear, which is of prime importance when using the softer inexpensive die materials, is a feature with Kondor Draw.

Avoids Pickup And Scratching

Kondor Draw has the peculiar property of eliminating pick up with its resulting scratching and scarfing. Kondor Draw prevents the loss of time from shutdowns due to wearing down the die from honing and necessitating frequent replacement. On many jobs Kondor Draw has eliminated buffing and polishing, thus speeding up vital war material.

It is not necessary to remove Kondor Draw from parts before heat treatment as it does not contain any soap or other ingredient which would char on the surfaces of the work. Kondor Draw is safe and pleasant to work with as it has a pleasing odor and will not become rancid. It is not injurious to operators or workmen in any way and will not cause infection or dermatitis. Its reduction by dilution with water to suit any particular operation makes it very economical to use. It can be applied by brushing, dipping or by spraying or it can be applied as a powder. Painting, plating and finishing departments will welcome the use of Kondor Draw in the solvent type of degreasing as well as with the alkaline method.

Kondor Draw is the only product of its kind to be awarded prime contracts by the War Department.

—Adv

The best trained troops require tempering under fire to become seasoned fighters. Springs, too, need proper tempering to fit them for the rigorous demands of tough fighting mechanisms. Because heat-treatment is so vital to spring performance, its selection and control come within the realm of our laboratory technicians, with automatic regulation that insures parade-ground precision—precise action—long service. No guesswork—Barnes-made Springs are under strict discipline in *every* stage of manufacture. They obey *your* orders.

CONSERVE METAL—DESIGN WISELY

1918 – THEN AND NOW

ARMY NAVY

Barnes-made Springs

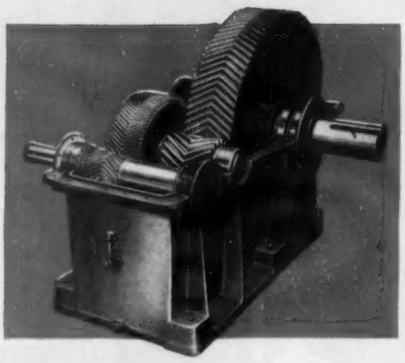
ENGINEERED PEP AND POWER

WALLACE BARNES COMPANY DIVISION OF ASSOCIATED SPRING CORPORATION BRISTOL, CONNECTICUT, U. S. A.

THE RIGHT SPEED REDUCER FOR YOUR NEED BEARS THE NAME LINK-BELT

BECAUSE

Link-Belt manufactures all types, Link-Belt Power Transmission experts can aid you with unbiased counsel to select the type and size to give you the most efficient performance.

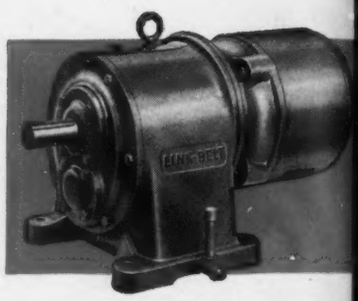


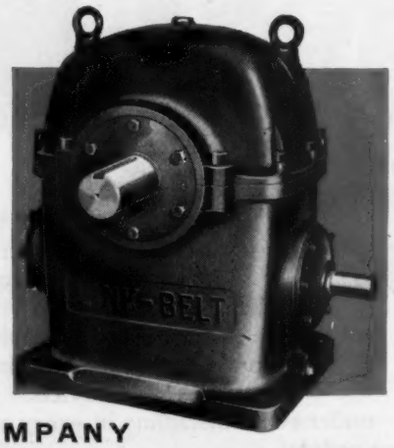
HERRINGBONE GEAR REDUCER

Made for all-around ruggedness, efficient high speed operation and ability to withstand shock loads, with quiet operation and complete protection against dust, dirt and fumes.

MOTORIZED HELICAL GEAR REDUCER

Provides unusual compactness, simplicity and economy in first cost, with high efficiency and durability. Available in 8 standard sizes, double and triple reduction types.





WORM GEAR REDUCER

For large ratios and flexibility of arrangement and where drive of right-angle type or other shaft combinations in single and double reductions are required. Horizontal and vertical types.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices, Factory Branch Stores and Distributors in principal cities.

On any Power Transmission problem, get the right answer. Consult the largest manufacturer of Power Transmission Machinery.

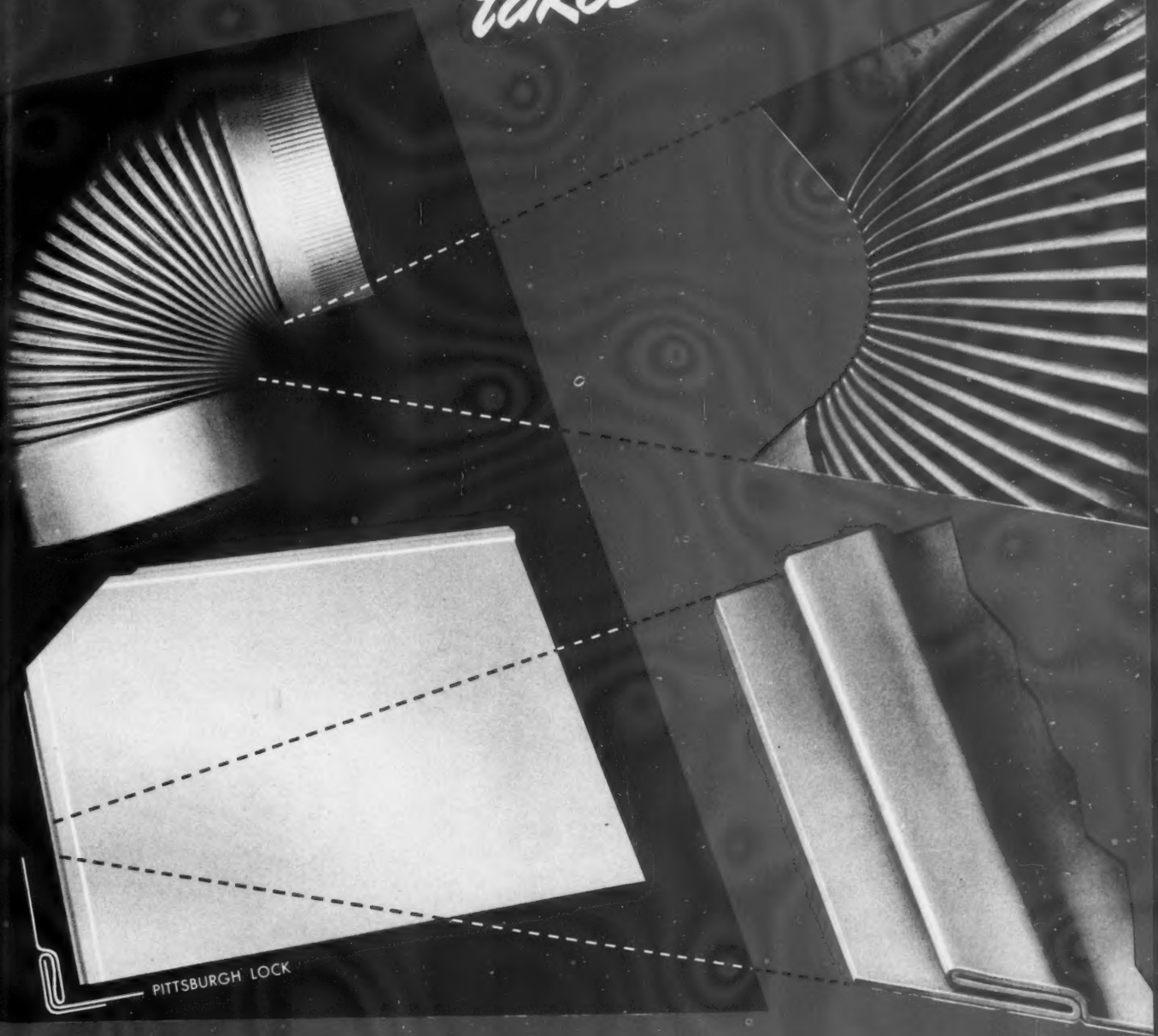
LINK-BELT SPEED REDUCERS

9834

Weirzin

ELECTROLYTIC ZINC COATED SHEETS AND STRIP

takes it easy . . .



• A highly ductile steel base and a coating that sticks with it

If peeling, flaking, rusting are among your product problems—try a test sample of Weirzin. Weirzin consistently demonstrates a much higher fabricating efficiency and a remarkable resistance to heat and moisture.

Weirzin electrolytic zinc coated sheet and strip is available in coils or cut lengths from 3/8 to 35" widths. Write for sample and technical booklet. Learn the definite business advantages of this revolutionary new material.

WEIRTON STEEL CO.

WEIRTON STEEL COMPANY

WEIRTON, W. VA. *Sales Offices in Principal Cities*

Division of NATIONAL STEEL CORPORATION *Executive Offices, Pittsburgh, Pa.*

NATIONAL STEEL CORPORATION

IT MAKES LESS FUSS

A prewar refrigeration compressor built by York Ice Machinery Corporation. Pistons and connecting rods are Alcoa Aluminum permanent mold castings. Suction valves, discharge valve plates and cages are also aluminum.

about doing more work

Alcoa Aluminum Alloys help to make this York compressor lightweight and compact.

The V/W design has the same crank effort characteristics as does an "in line" cylinder arrangement. The lightweight aluminum pistons and connecting rods reduce reciprocating and rotating weights and make balancing easier, with consequent reduction in vibration. Higher rotative speeds are possible, therefore.

The aluminum alloy connecting rods serve as bearing metal, eliminating the need for bearing inserts at the crank and wrist pins. The high heat conductivity of the pistons helps to reduce compression chamber temperatures. And of great importance here, aluminum works well in contact with the refrigerant, Freon-12.

ALUMINUM COMPANY OF AMERICA, 2112 Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA FIRST IN **ALUMINUM**

ALCOA ALUMINUM

LEM APPLIES *Engineered Heat*

TO CAR-TYPE FURNACES

There is no secret about the requirements of an efficient car-type heating furnace installation . . . sturdy construction, good insulation, tight heating chamber, foolproof controls, and an economical heating system.

In designing car-type furnaces, as well as rotary, batch, and other types, both direct fired and recirculating, our engineers combine engineering with economics, a service we like to call — *Engineered Heat.*

Built to withstand hard usage, designed to operate economically, and equipped with precision controls, Salem Car-Type Furnaces will keep your heat treating quality *up* and your cost per piece *down.*

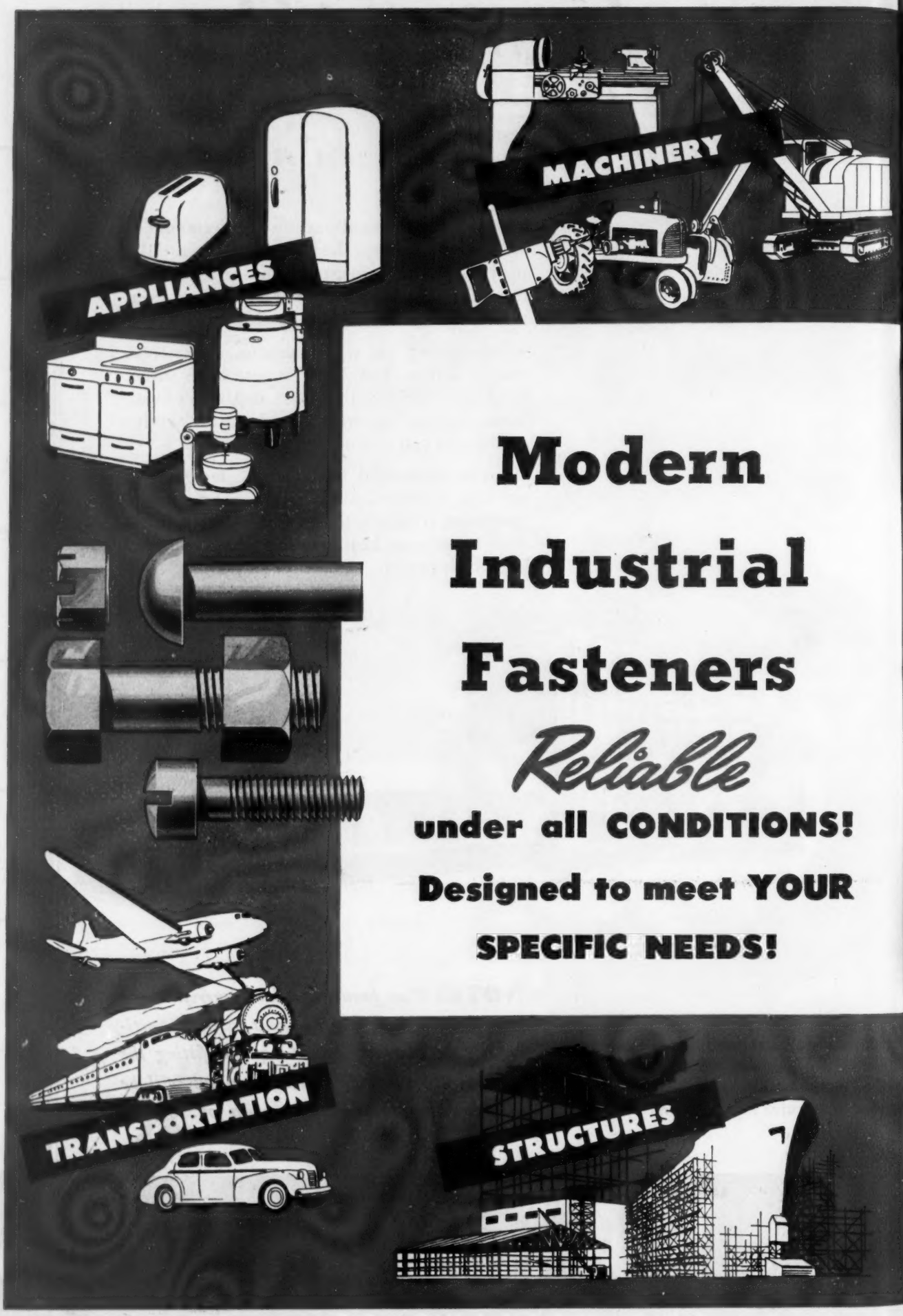
Salem builds all sizes and types of car-type furnaces, for gas, oil, or electric, direct fired or recirculating. Salem is the exclusive builder of circular ingot heating furnaces.

NOTE: *War production has spurred many sensational developments in heat treating, particularly in controls, quenching and fitting the parts to the method. Salem engineers will be glad to discuss these advances with you.*

SALEM **SALEM** OHIO

ENGINEERING CO.

SALEM ENGINEERING COMPANY


APPLIANCES
MACHINERY
Modern
Industrial
Fasteners
Reliable
under all CONDITIONS!
Designed to meet YOUR
SPECIFIC NEEDS!
TRANSPORTATION
STRUCTURES

Special Qualities of Fasteners

that improve products and help fabrication

UNIFORMLY ACCURATE

Modern manufacturing methods as employed by fasteners makers, produce fasteners in large quantities having the degree of precision in dimensions required for fabrication of structures of all types. Whether your requirements are for extremely close tolerances for precision work, or high grade commercial quality, the products of up-to-date fasteners manufacturers today are uniform and dependable.

HIGH TENSILES

Carefully selected alloy steels properly heat treated are used by manufacturers to increase tensile strengths for application requiring this property.

CORROSION RESISTANCE

Fasteners are made from corrosion-resisting metals, or protected by coatings such as zinc plating, galvanizing, etc., wherever corrosion resistance is required.

HIGH FATIGUE STRENGTH

In dynamically stressed studs, high fatigue strength can be obtained by proper design without any weight increase.

FLUSH HEADS

Several types of countersunk, recessed, flat and other heads for bolts, cap screws and rivets are standard production with most manufacturers for use where required for surface smoothness or close fitting parts.

SPECIAL FINISHES

In addition to regular ground, machined or polished surfaces, you can get fasteners that are cadmium or chromium plated or otherwise specially finished for appearance, protection or other reasons.

DUCTILITY

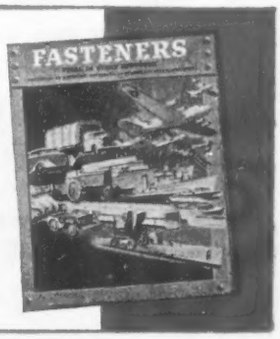
In many fastening jobs, a certain amount of ductility is desirable, and bolts or rivets providing that property can be obtained according to specification.

HARDNESS

This important and useful characteristic is readily obtainable in fasteners through modern hardening methods. The wide variety of materials from which fasteners are made permits a wide range of hardening.

Useful Data

Let us put your name on the list to receive, regularly, issues of FASTENERS, containing interesting and useful data on the application of headed and threaded products.



AMERICAN INSTITUTE OF BOLT, NUT AND RIVET MANUFACTURERS
1550 Hanna Building · Cleveland 15, Ohio

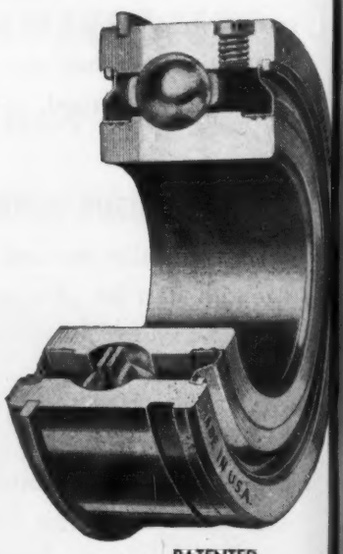
THAT EXTRA SOMETHING...

FOR THE LONG, HARD PULL

IN AN ATHLETE, it is called "STAMINA." In a ball bearing, it is DURABILITY—and it is determined by the inbuilt features that safeguard against wear and break-down.

The NORMA-HOFFMANN "CARTRIDGE" BALL BEARING has all these vital features, developed to the last degree:—wear-less, friction-free, all-metal seals (removable and replaceable) sealing lubricant in and dirt out, regardless of shaft angle; at least double the grease capacity of any other single-row bearing. A design that holds the grease ON THE ROLLING SURFACES, where it is most effective.

Read about these, and other, valuable features of the NORMA-HOFFMANN "CARTRIDGE" BALL BEARING in the Catalog, sent on request. Or, ask our nearest office to have one of our Field Engineers call and explain.



PATENTED

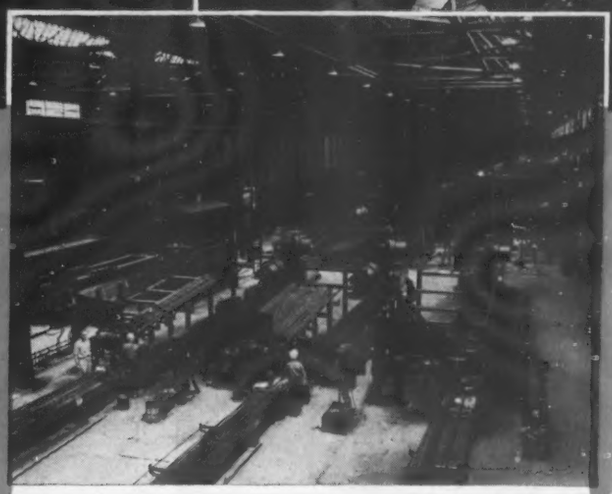
NORMA-HOFFMANN BEARING CORPORATION

STAMFORD, CONNECTICUT ★ Founded 1911

Field Offices: NEW YORK • CHICAGO • CLEVELAND • CINCINNATI • PITTSBURGH • DETROIT • LOS ANGELES • SAN FRANCISCO • SEATTLE, WAS

Vaughn

DRAW BENCHES

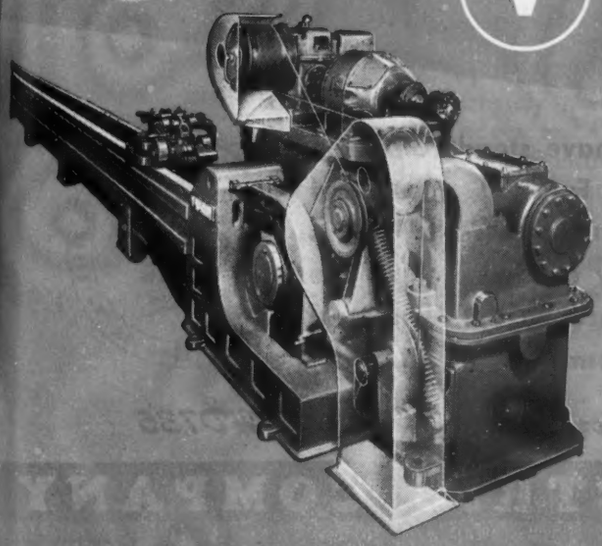


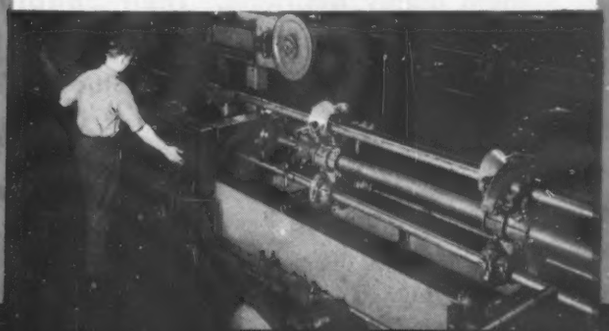
BUILT FOR SMOOTH, FAST, SAFE HANDLING OF HEAVY PRODUCTION OF

Bars, Tubes Shapes

WITH STRENGTH AND DURABILITY FOR YEARS OF PEACETIME PERFORMANCE, TOO

Plan *your* postwar cold drawing operations upon the solid base of Vaughn Draw Bench performance—for the productivity and durability that built better profits!



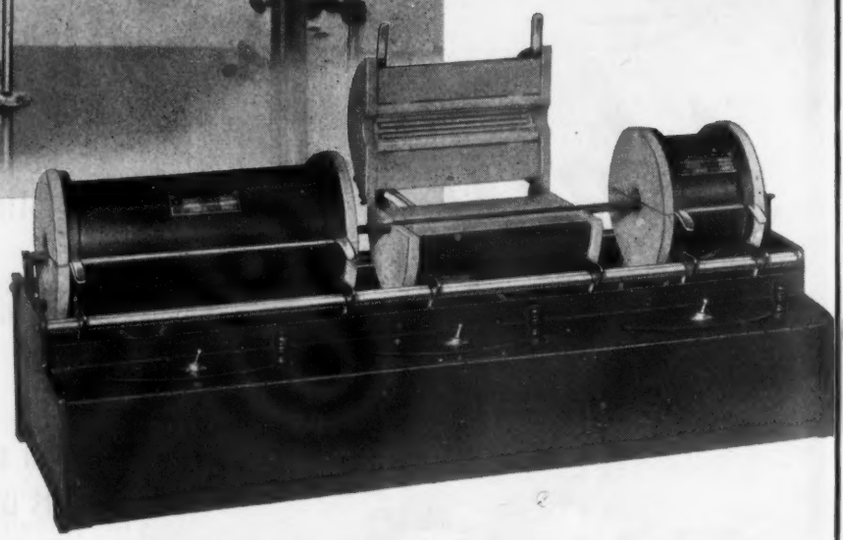


THE VAUGHN MACHINERY CO. · *Cuyahoga Falls, Ohio*

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

MULTIPLE UNIT
Electric

ORGANIC COMBUSTION FURNACES



Heating unit for Vapor Phase Catalysis.

Research by Dr. Ray Wendland,*

Most laboratories doing organic analyses have standardized on Multiple Unit Electric Organic Combustion Furnaces. Ease and exactness of temperature control and economy of operation makes them highly desirable. Their adaptability is illustrated in the vertical employment of a standard furnace by Dr. Wendland in his "Vapor Phase Catalytic Studies" (*J. Chem. Educ. 21, 171, 1944).

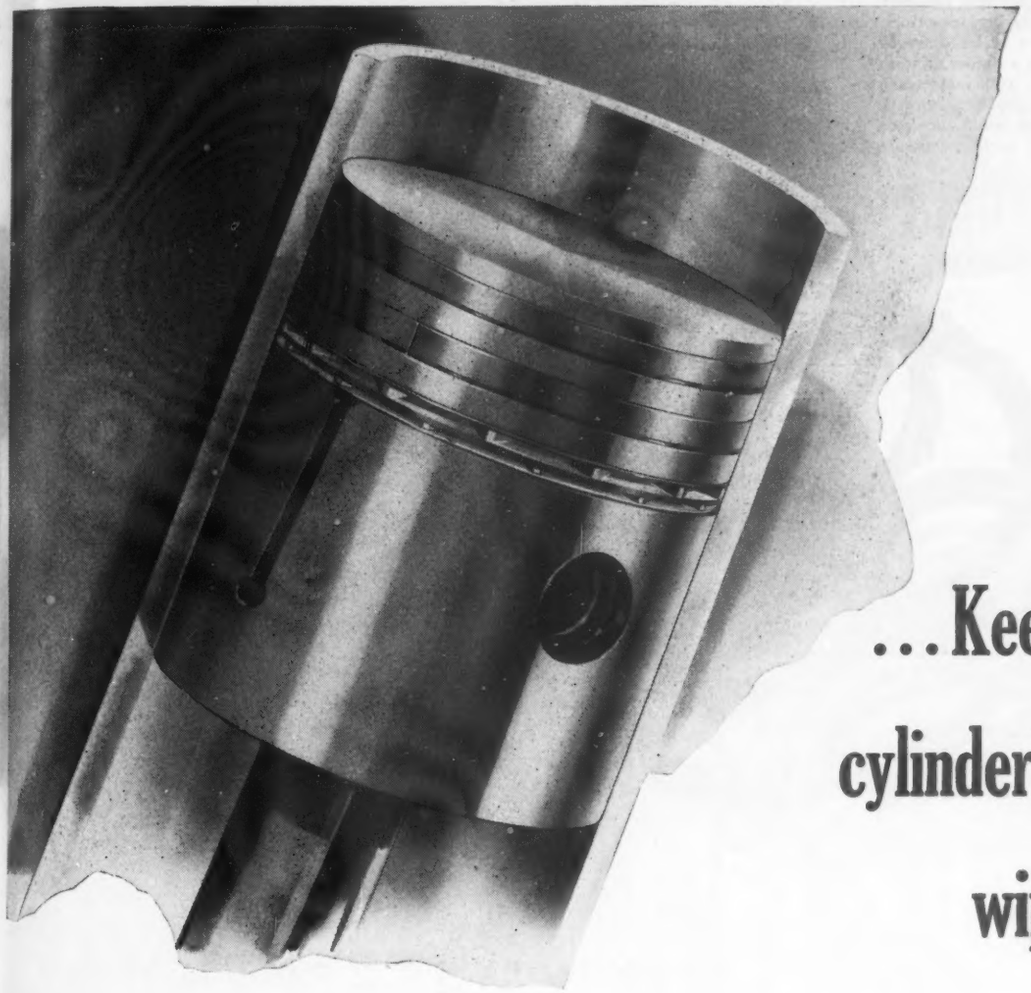
See Your Laboratory Supply Dealer or write for Bulletin HD735

HEVI DUTY ELECTRIC COMPANY

LABORATORY FURNACES MULTIPLE UNIT ELECTRIC EXCLUSIVELY

TRADE MARK REG. U. S. PAT. OFF.

MILWAUKEE, WISCONSIN



...Keeping a cylinder's face wiped off

TOO *much* oil inside a cylinder means wasteful burning with each explosion. Too *little* results in friction between rings and cylinder wall.

So, piston ring manufacturers developed an oil ring in *3 segments*—one thick, open ventilated ring between two extremely *thin* rings. Result—*3* wiping edges, and a wiping action that adjusted itself more perfectly to the contour of the cylinder.

Developing the right kind of *steel* to extremely close tolerances for those thin outer rings was a special problem.

It had to be *heat resistant* to withstand the temperatures inside a cylinder without warping... *tough* enough to stand up in that very *thin* form without cracking... *highly resilient* to conform to the shape of a worn cylinder without being permanently distorted.

That's why we at Athenia had a hand in making the steel which would meet those exacting requirements... why we take special pride in the satisfactory performance these rings are now delivering.

If you have a precision steel problem involving stocks 1/16″ to 6½″ wide, .0015″ to .062″ thick, annealed, cold rolled, tempered, or tempered polished and colored, let Athenia's 30 years' experience help *you*.

NS
The ATHENIA STEEL Company
QUALITY NOW OF NATIONAL-STANDARD

★ BUY AND KEEP WAR BONDS

Divisions of National-Standard Company

THE ATHENIA STEEL CO.
Clifton, N. J.
COLD ROLLED, HIGH-CARBON SPRING STEEL

NATIONAL-STANDARD CO.
Niles, Mich.
TIRE WIRE, FABRICATED BRAIDS AND TAPE

WORCESTER WIRE WORKS
Worcester, Mass.
ROUND STEEL WIRE, SMALL SIZES

WAGNER LITHO MACHINERY CO.
Hoboken, N. J.
LITHOGRAPHING AND SPECIAL MACHINERY

For speeds around 60,000 rpm, Micarta retainers have many advantages. One bearing in a high speed grinder was inspected after 18 billion revolutions, okayed and put back. On a similar grinder, tolerances of 0.00005 inch are still maintained after 15 months with the same bearings. Micarta retainers have permitted spindle speed increases that upped production from 17 to 65 pieces per hour.

Steer Steel Balls at Bullet Speed

...AND WORK TO ± 0.00005 INCH!

Precision requirements, greater speeds and loads have taken ball-bearing retainers from sheet steel stampings . . . to machined brass . . . to Micarta.

Tolerances of the balls themselves are made to 0.000005 inch. And recent research has shown that, at high speeds, accuracy is important in the retainers as well.

This accuracy was easy with MICARTA, in automatic precision tool machines.

MICARTA is light in weight . . . has great mechanical strength and ample rigidity with greater shock-absorbing power . . . is less subject to vibration and fatigue, operates more quietly.

MICARTA aids lubrication, since it "wets" better and lubricants adhere to it.

MICARTA's rare combination of physical properties has proved its right to many new jobs. If you need lighter weight, high strength and resistance to wear, write for your copy of the new Micarta Data Book B-3148-A. Write to Westinghouse Electric & Mfg. Co., P. O. Box 868, Pittsburgh 30, Pa.

J-06362

Quiet operation, strength and power to absorb shocks make Micarta best for this stoker gear and cam.

25 to 50% lower power cost—20 to 40 times longer wear than metal—no lubricating expense, with Micarta Steel Mill Roll Neck Bearings.

Resilience, smooth surfaces, resistance to mild acids and long life recommend Micarta Spinning Buckets for the Rayon Industry.

Westinghouse

Micarta

THE INDUSTRIAL PLASTIC

"Get this QUICK ANSWER CHART showing the JOHNS-MANVILLE INSULATION for every industrial temperature"

NOW, you can see at a glance the recommended material for every temperature range, from minus 400° F. to plus 2600° F.

It's all on this convenient J-M Chart (11½ x 18 inches, in color) available for your office or plant wall.

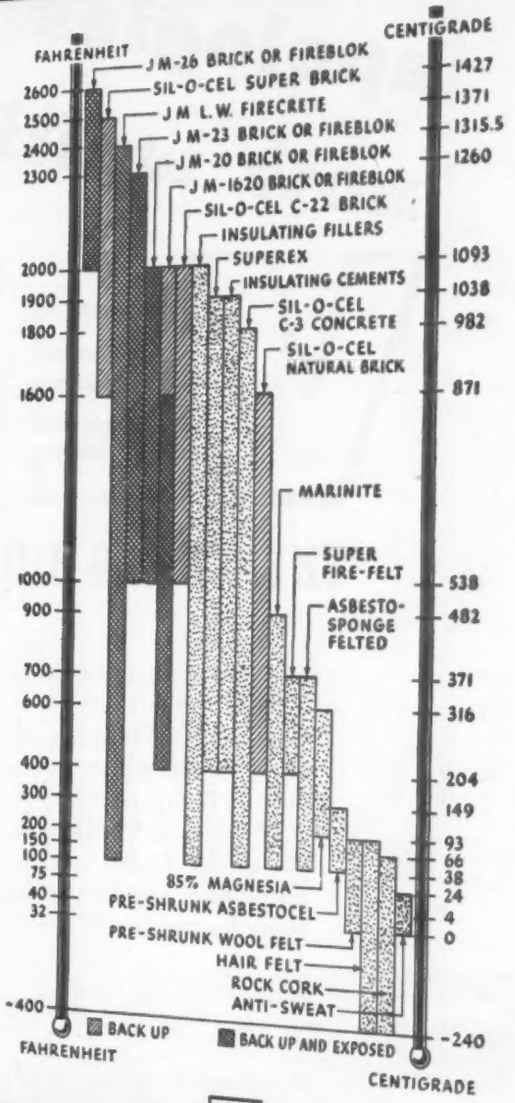
Each material in this J-M group of insulations is tailor-made to do one special job *best.* And, as part of the Johns-Manville Insulation Service, J-M specialists are available to help you with present insulation problems . . . or with those connected with future plans.

By having these insulations applied by J-M Technical Service Units or J-M's own construction forces, you will be certain of a thorough, speedy and economical installation. In this way you can be assured of obtaining the utmost in both insulating efficiency and length of service.

Write today for your complimentary copy of the "QUICK ANSWER CHART." Address: Johns-Manville, 22 East 40th Street, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville INDUSTRIAL INSULATIONS



JM

for { EVERY TEMPERATURE EVERY SERVICE CONDITION

Johns-Manville

INDUSTRIAL INSULATIONS
for every temperature—for every service

Our thanks – and apologies to those now waiting for

VEGA

THE SUPER-DUTY SILICA BRICK!

The steel industry's quickly growing interest in and demand for VEGA exceeds our present facilities for the production of this super-duty silica brick. While naturally gratified by the reception given VEGA brick, we regret that, due to the mounting demand, there must be some delay in filling orders.

The story of VEGA Super-Duty Silica Brick . . . its development . . . its 60° to 100° higher refractoriness under load . . . and its performance in open-hearth and electric steel furnaces is now on the press. It will soon be ready for mailing. Write for a copy.

IMPORTANT NOTICE...

Licensing Arrangement

A definite contribution to longer furnace life and greater steel production, VEGA brick should be made available as soon as possible to the largest number of steel producers.

Harbison-Walker will therefore license other responsible producers of silica refractories to manufacture brick under VEGA patents.

Super-duty silica refractories, made under the VEGA patents by other manufacturers, will carry this identifying symbol of plus quality + following the manufacturer's established brand name.

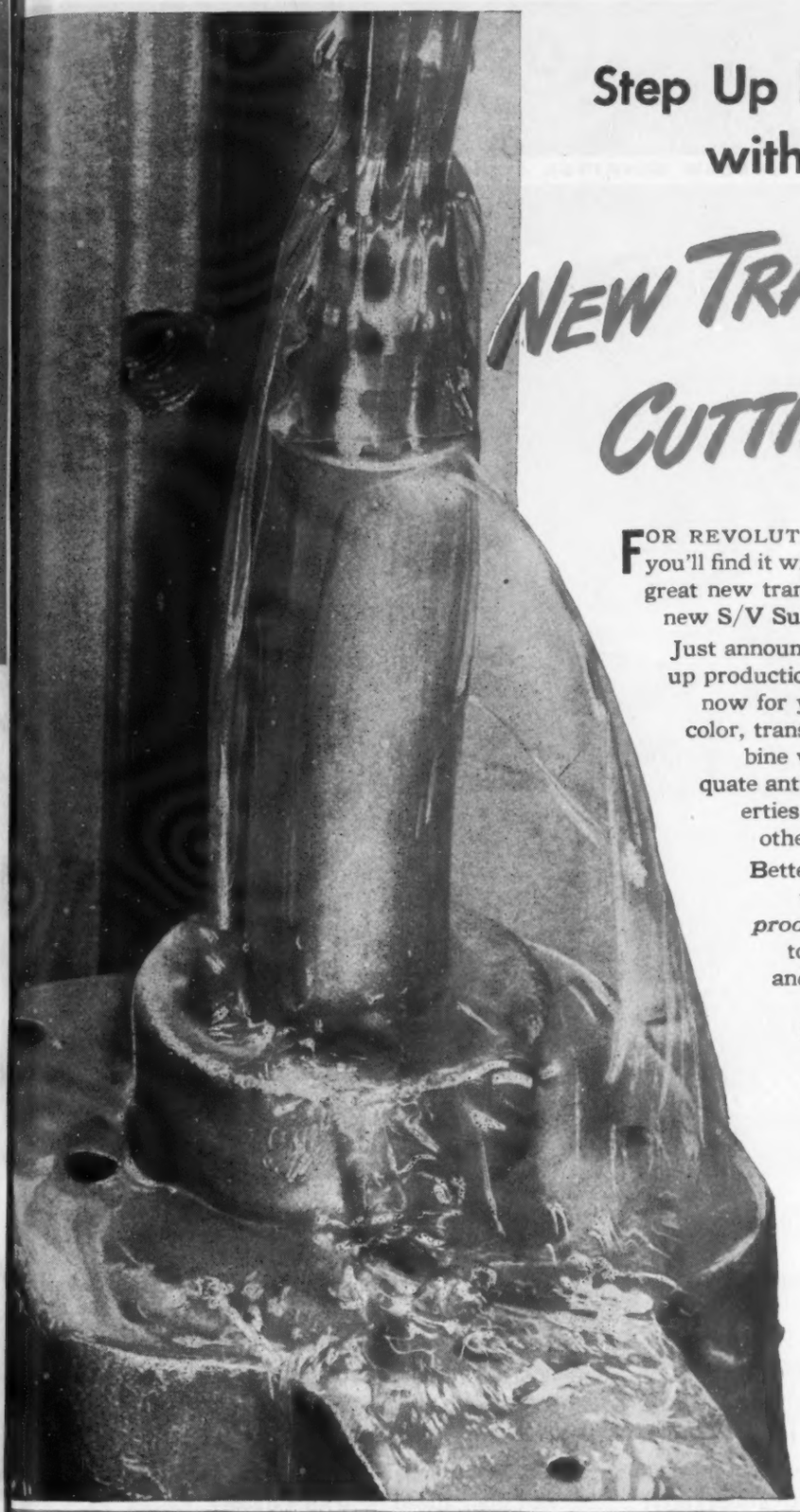
HARBISON-WALKER REFRACTORIES CO.

AND SUBSIDIARIES

World's Largest Producer of Refractories

TRADE-MARK REG.U.S.PAT.OFF.

GENERAL OFFICES · PITTSBURGH 22, PENNSYLVANIA



Step Up Production with these NEW TRANSPARENT CUTTING OILS!

FOR REVOLUTIONARY cutting oil performance, you'll find it will pay you to try Socony-Vacuum's great new transparent, odorless cutting oils—the new S/V Sultrans.

Just announced, these oils already are stepping up production in many shops and are available now for your cutting operations. Their light color, transparency and odorless nature combine with outstanding lubricity and adequate anti-weld and extreme-pressure properties to give you these advantages over other oils:

Better visibility of work and *improved working conditions* for operators; *production increases* ranging from 25 to 200 per cent; *far longer tool life* and *vastly improved finish* on difficult work like this broaching job; less sensitivity to changes in hardness and structure of metals and speeds of cut, and *better drainability* for less "carry-away" and lower oil consumption.

Be sure to get performance facts and figures on these new S/V Sultrans, from your Socony-Vacuum Representative.

SOCONY-VACUUM OIL CO., INC.
Standard Oil of N. Y. Div. • White Star Div. • Lubrite Div. • Chicago Div. • White Eagle Div. • Wadhams Div. • Magnolia Petroleum Co. • General Petroleum Corp. of Calif.

Socony-Vacuum's FIVE STEPS to Lower Production Costs for You

1. Lubrication Study of Your Entire Plant
2. Lubrication Schedules and Controls
3. Lubricant Storage and Handling System
4. Skilled Engineering Counsel
5. Progress Reports of Benefits Secured

GARGOYLE Lubricants

Contact KAYDON *of Muskegon*

FOR ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER

Typical of KAYDON'S successful specialization in difficult manufacture is this flat race ball thrust bearing 22.000" x 26.000" x 1.000". Races are only .3125" thick, held to .001" parallelism. Bearings are made 4" bore to 120" O. D.

As readily and economically as standard types and sizes are manufactured, KAYDON produces special bearings that banish the need for using "catalogued" bearings that fail to meet your exacting needs.

That is the *specialized* service, created by KAYDON to meet rigid wartime requirements of the U. S. Navy — available to industry as an economical means of product refinement. Atmospheric control in heat treating, rarely provided by special bearing manufacturers, is available at KAYDON. In addition, KAYDON offers added services in flame hardening, precision heat treating, metallurgical laboratories, microscopy and physical testing.

Counsel in confidence with KAYDON. While vital wartime requirements have precedence, capacity for general production is constantly increasing. Look ahead — and plan ahead — with KAYDON!

KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller
Ball Radial • Ball Thrust
Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP.

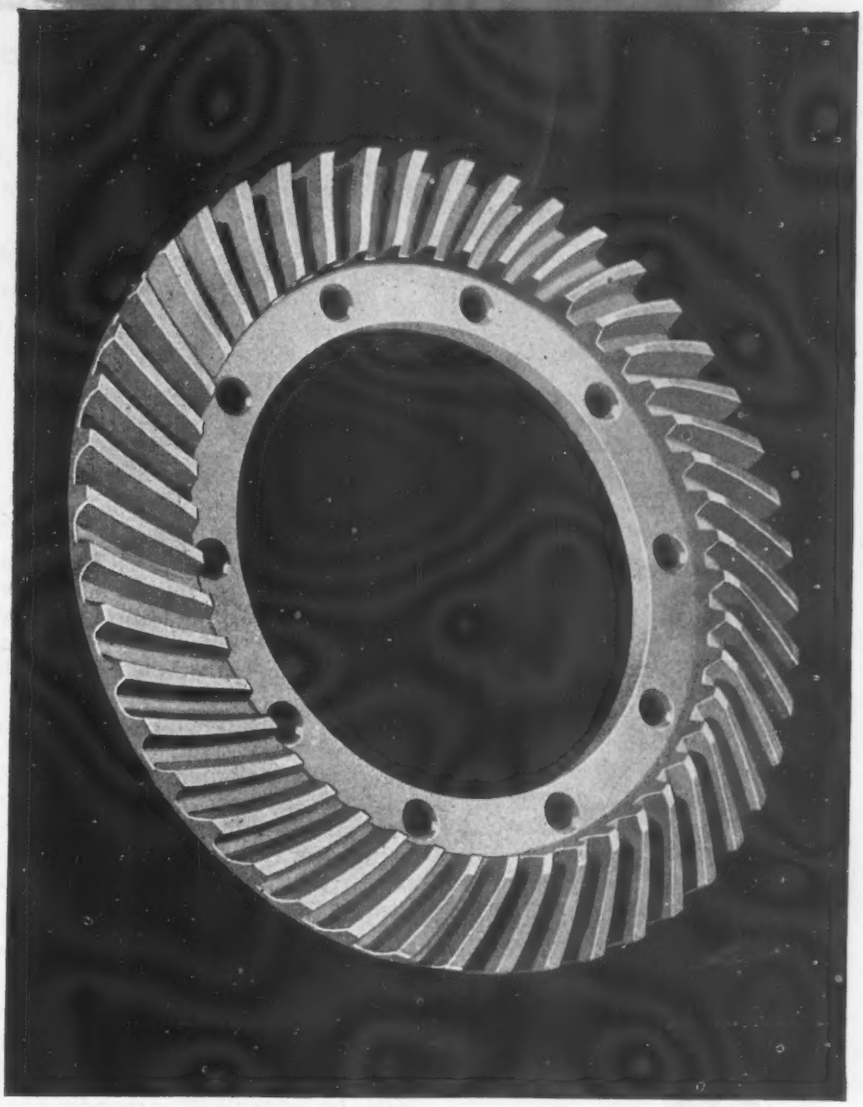
MUSKEGON · MICHIGAN

New in Name . . . Old in Experience

For light weight

Without sacrifice of strength —No other material can *Equal*

ALLOY STEELS



In the years just ahead, light weight will become more and more important as a specification of automotive equipment — because light weight means greater efficiency and economy in operation.

Republic Alloy Steels will help you achieve light weight—*without sacrifice of strength.*

These fine steels are exceptionally high in strength-to-weight ratio. They can be used safely in smaller sections. They are unsurpassed in hardenability — resist wear. They are tough and strong — withstand shock and severe strains. They have the endurance to resist fatigue. They perform safely at "red" heat or in sub-zero cold. And they resist corrosion.

All in all — Republic Alloy Steels will do the rough and tough jobs — the important jobs — efficiently *and at low cost.*

Republic—world's largest producer of alloy steels—is ready to have an experienced metallurgist discuss your needs and tell you which analysis to use for best results.

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic

ALLOY STEELS

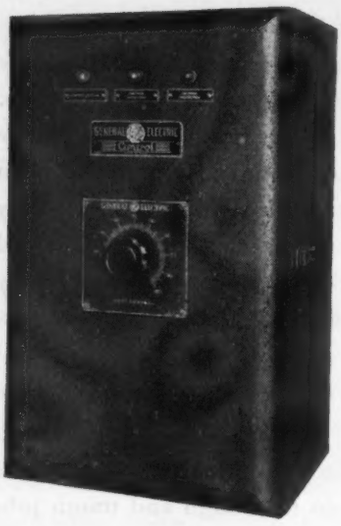
Other Republic Products include Carbon and Stainless Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

SAVE TIN AND SPEED UP PRODUCTION OF SMALL PARTS

With these resistance-welding controls, jobs take half as long as soldering

They cut down rejects by providing accurate control of current and time.

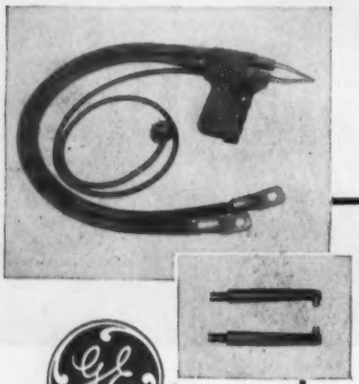
They save time by quick, finger-tip adjustment of current and time settings for different welding conditions.



CR7503-A136

This compact, half-cycle, thyratron control panel has a built-in transformer. It can be installed on, or mounted under, the assembly bench. A calibrated dial on the front of the panel provides easy adjustment of the weld time.

PRODUCTION rates are being stepped up more and more through the use of new and improved, electronically controlled, bench and tong welders. With these welders, the jobs that were impossible yesterday, are done quickly and easily today. With tin and time at a premium, many manufacturers who formerly used soldering have now turned to resistance welding. Another big advantage of resistance welding is that properly welded joints will not come apart at high temperatures.



CR7503-A133

This control panel, electrically the same as the CR7503-A136, but designed for wall mounting, has no transformer with it. Useful where space is limited, as the control can be remotely located.

Do these controls "fill the bill"?

If you would like complete information on these controls and welding tongs, send today for bulletin (GEA-3045). If these controls aren't the answer to your problem, let us know. We have a complete line of electronic controls for resistance welding. *General Electric, Schenectady 5, N.Y.*

NEW TONGS FOR THESE CONTROLS

These tongs are used with either of the half-cycle controls described when welding small parts in a restricted space. Especially suitable for welding solid or stranded wire to metals such as copper, brass, bronze, steel, ferrous alloys, etc. Tongs are equipped with replaceable tips, and will take other tips made by the user for individual needs. Flux or solder is unnecessary, and the pressure for the weld can be accurately adjusted on the pistol-shaped handle. The weld is made automatically when pressure is exerted on this handle.

RESISTANCE-WELDING CONTROL

BUY WAR BONDS

GENERAL ELECTRIC

645-28-8960

A NEW CATALOGUE THAT WILL HELP YOUR PRODUCT PLANNING

The Standard Products Co., manufacturers of thermo-plastics, thermo-setting plastics, molded mechanical rubber goods, metal stampings, glass run window channel, munitions and automobile hardware, have compiled a comprehensive brochure of their diversified manufacturing.

The new Standard Products Co. Catalogue is profusely illustrated and offers many ideas to manufacturers in the use of plastics, steel stampings, and molded rubber.

IT'S A STANDARD PRODUCT

MAIL THE COUPON FOR YOUR COPY OF THE CATALOGUE AT ONCE

Standard Products Co., 505 Boulevard Building, East Grand Boulevard, Detroit 2, Michigan.

Gentlemen:

Please forward me a copy of your latest catalogue.

Thank you.

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Company _____

Street _____

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THE STANDARD PRODUCTS COMPANY

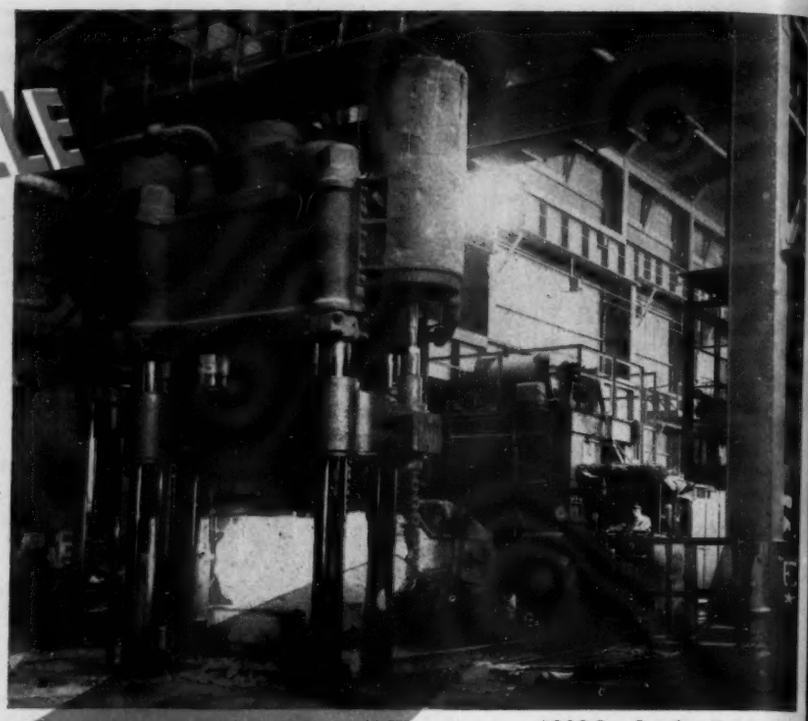
General Offices and Research Laboratory

505 Boulevard Bldg. • Woodward Ave. at E. Grand Blvd. • Detroit 2, Mich.

TITUSVILLE

PRECISION FORGINGS

The results of modern equipment . . . unexcelled facilities . . . over 50 years experience.



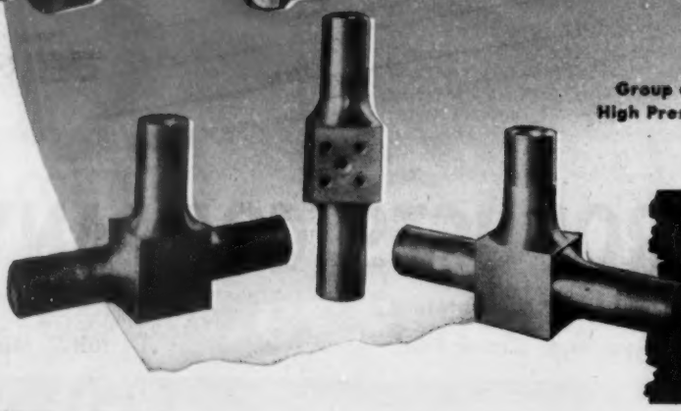
2000 Ton Forging Press
Part of the *advanced* production equipment used in making Titusville Precision-Forgings.

High Pressure Forged Cylinder for the Chemical Industry

Intricate Forged High Pressure Valves

Diesel Crankshaft with Hollow Pins and Hollow Journals

Group of Finish Machined High Pressure Valve Forgings



Forgings by TITUSVILLE are not confined to the ordinary types of metal—but embody a broad experience in designing and working with Stainless Steels and other new developments in corrosion resistant alloys. When peacetime production is resumed, precision-Forgings by TITUSVILLE will prove as indispensable for *quality* equipment as they are *now* for *exacting* war needs. For competent assistance in applying TITUSVILLE FORGE experience to your postwar plans—our engineers are available any time, anywhere.

ARMY (E) NAVY

SW

STRUTHERS WELLS CORPORATION

TITUSVILLE FORGE DIVISION

Plants at TITUSVILLE, PA. and WARREN, PA.

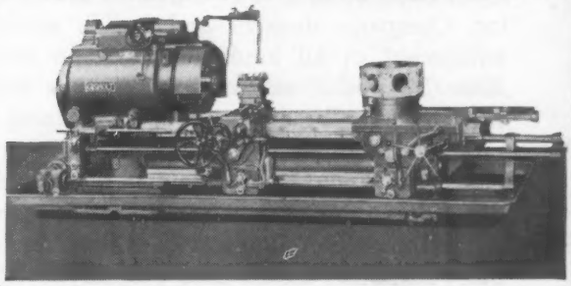
Offices from Coast to Coast

Natural Coordination FOR THE OPERATOR

Here's another good reason why operators prefer Gisholt Turret Lathes. They are easier to get "used to." All controls are within easy reach. For each machine function, the lever or wheel is exactly where it should be, so that the operator quickly finds it "second nature" to perform a series of operations in sequence . . . by natural reaction . . . like driving a car. *The machine is designed that way.*

Moreover, many of the machine functions are accomplished automatically or by power. The operator is relieved of many unnecessary motions. And he is relieved of fatigue, too.

It is another way in which Gisholt's 60-year leadership in design shows up in faster, easier production. Why not get all the facts?



GISHOLT SADDLE TYPE TURRET LATHES
provide power rapid traverse for the in-and-out motion of the square turret as well as for longitudinal travel of both turrets. If desirable, they may be equipped with cross-feeding hexagon turrets. Write for the Gisholt General Catalog.

GISHOLT MACHINE COMPANY
1217 East Washington Ave. • Madison 3, Wis.

Look Ahead . . . Keep Ahead . . . With Gisholt Improvements in Metal Turning

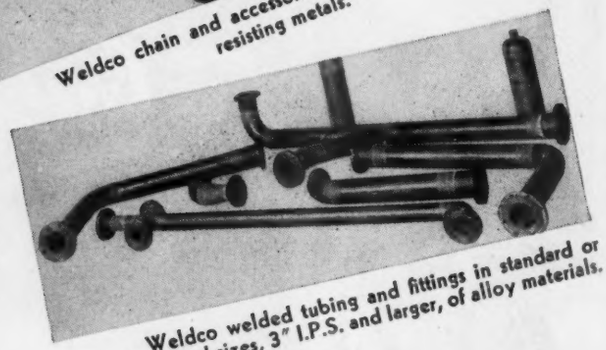
TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES • SPECIAL MACHINES

WHAT HAVE YOU THAT'S CORRODING

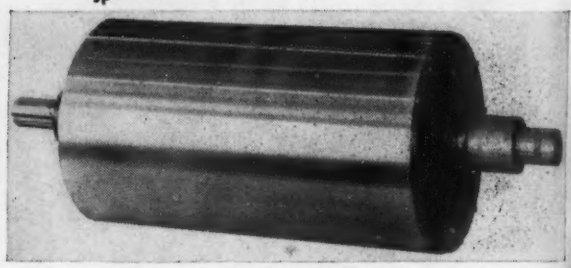
"WELDCO" is the trade name of The Youngstown Welding & Engineering Company, specialists since 1912 in fabricating alloy steels and other corrosion resisting metals.

The Youngstown Welding & Engineering Company specializes in fabricating equipment from alloys.

Weldco chain and accessories made of corrosion resisting metals.



Weldco welded tubing and fittings in standard or special sizes, 3" I.P.S. and larger, of alloy materials.



Rolls for paper mills and other industries are covered with Monel, stainless steel, etc. to resist corrosion and to give longer life.

HERE'S WHAT WELDCO CAN DO FOR YOU

American industry is chock-full of chronic production delays due to equipment and product failures which result from rust and corrosion. Practically alone in its specialized field, The Youngstown Welding & Engineering Company designs and builds special parts and equipment of all kinds of corrosion resisting metals. After 33 years' experience, Weldco engineers know what metal will meet best your combined corrosion and production problem. In a large, well equipped plant, men who "know how" fabricate these tricky metals into dependable equipment. Remember the cost of corrosion is far more than the cost of Monel, Inconel, Stainless Steel and other metals used properly.

So let Weldco engineers help you; write today stating your problem.

Weldco engineers will design and build large or small, special or standard equipment to help solve your corrosion problems. A partial list of Weldco products made of corrosion and rust resisting Monel, Inconel, cupro nickel, nickel, stainless steel, and alloys are: tubing, fittings, chain and accessories, pickling and heat treating crates and baskets, steam jets, tanks, kettles, agitators and miscellaneous rolls. WRITE FOR LITERATURE, stating your problem.

WELDCO *Specialists in Corrosion Resistance*

THE YOUNGSTOWN WELDING & ENGINEERING CO.

3711 OAKWOOD AVE. YOUNGSTOWN, OHIO

FOUR GRAYS in the SERVICE

Oliver Gray, Roll Grinder, has put in 36 years in the Industrial Service at Lewis. Today, many of the Rolls he has finished are rolling steel which may be part of the equipment his three sons in the Armed Services are depending on . . . Pvt. Oliver Jr. is with the Aviation Signal Corps in Italy . . . Pvt. Harold with the Army Air Corps Ground Forces . . . Seaman 2/c Walter is somewhere with the Navy.

Oliver is proud of his sons—proud of his job at Lewis.

ARMY E NAVY

Also manufacturers of
ROLLING MILL MACHINERY
for the iron, steel and non-ferrous industries

LEWIS FOUNDRY & MACHINE
Division of BLAW-KNOX Company, Pittsburgh, Pa.

LEWIS ROLLS

AT YOUR

ENGINEERED ANSWERS TO

FOR maximum production . . . top efficiency . . . lowest operating cost, give your machines the finest in lubricants—Tycol oils and greases. Tycol lubricants are made to meet every lubrication need of industry — from roll neck greases for steel mills to spindle oils for textile plants. Each Tycol lubricant is scientifically engineered to meet specific service conditions. At every step from selection of crudes to blending of the finished product, Tycol lubricants are processed to provide maximum lubricating efficiency which means greater economy, longer machine life for every type of equipment.

Tide Water engineers are thoroughly experienced in all phases of industrial lubrication. They will be glad to assist you in selecting the Tycol lubricant best suited to your specific need. Call or write your nearest Tide Water Associated office for further details.

TIDE WATER ASSOCIATED OIL COMPANY

MAKERS OF THE FAMOUS VEEDOL MOTOR OIL • Eastern Division: 17 Battery Place, New York 4, N. Y.

Principal Branch Offices: Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

DRUMS! DRUMS! DRUMS!

War needs make it extremely important that all empty drums be returned immediately

Have You Received Your Copy of "Lubricania"?

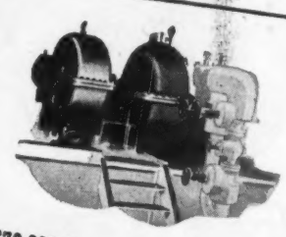
This informative handbook, "Tide Water Associated Lubricania", gives clear, concise descriptions of the basic tests used to determine important lubricant properties — Viscosity, Pour Points, Neutralization Number and many others. For your free copy write to Tide Water Associated Oil Company, 17 Battery Place, New York 4, N. Y.

TYCOL

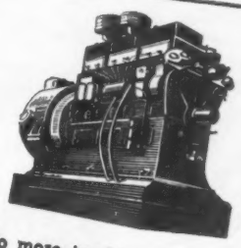
SCIENTIFICALLY

. . . Fingertips

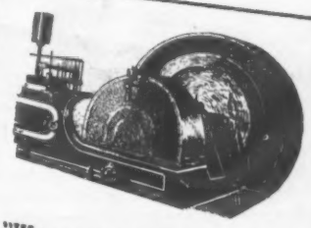
EVERY LUBRICATION NEED



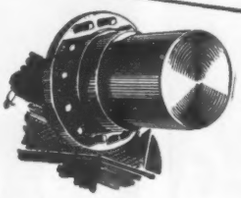
"70,000 Hours continuous operation . . . neutralization only .09." That's typical of the unusual performance achieved with Tycol Turbine Oil. Thanks to Tide Water's Edeleanu process, this oil has greater stability and resistance to emulsification . . . assuring more economy, steadier operation, smoother performance.



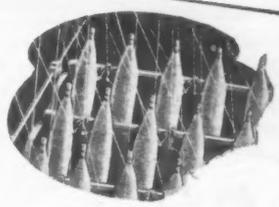
"No more trouble with sticking valves . . . costly delays and overhauls eliminated . . . engines giving better service . . ." — that's how one plant engineer describes the improved results gained with Tide Water Diesel Oil. It assures maximum economy — top performance — from every gallon of lubricant.



"We saved 33⅓% in oil costs when we changed to Tide Water E. A. Cylinder Oil." That report from a plant engineer typifies the kind of economical, trouble-free lubrication provided by Tide Water Steam Cylinder Oil in hundreds of plants. It gives better protection, promotes efficient operation and lowers lubrication costs.



"Never a single bearing overheated since we changed to Tide Water Green Cast Grease," says one chief engineer. No matter how severe the service, Tide Water Green Cast Greases assure better lubrication . . . less maintenance. The reason? They contain more high-grade cylinder oil — less soap — which means better performance in every application.



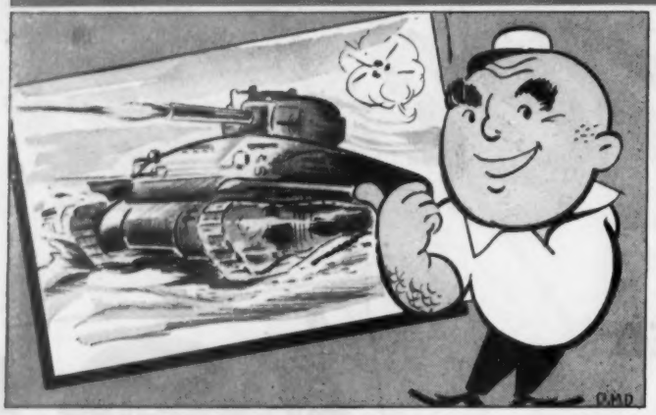
"300,000 Spindles operating for 13 years without a single lost tube" — that's a textile mill operator's way of pointing out the superior performance of Tycol Spindle Oils. For every textile application — from power plant to finishing — there's a Tycol Lubricant scientifically engineered for the job.

INDUSTRIAL TYCOL OILS-GREASES

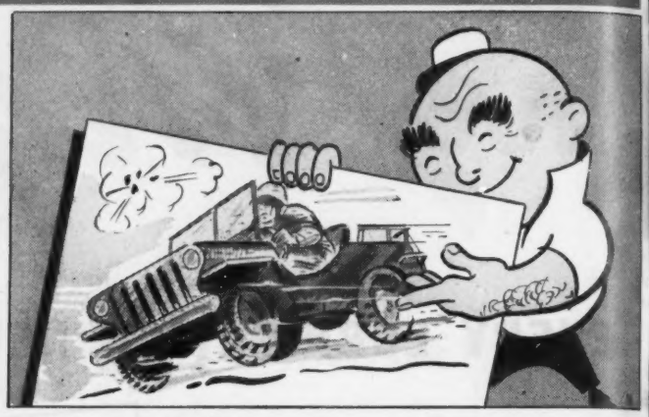
INDUSTRIAL LUBRICANTS

ENGINEERED FOR EVERY INDUSTRIAL USE

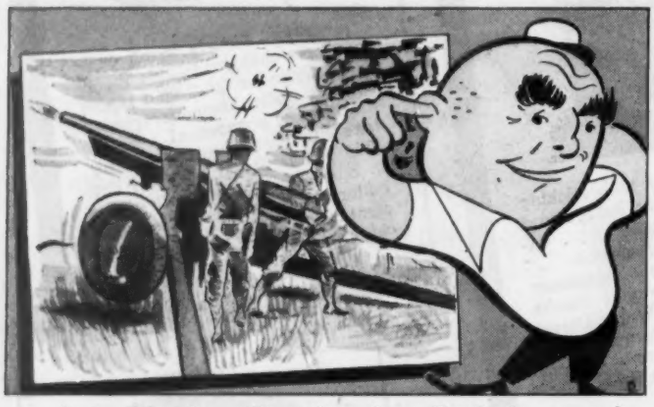
BUNDYWELD AT WAR



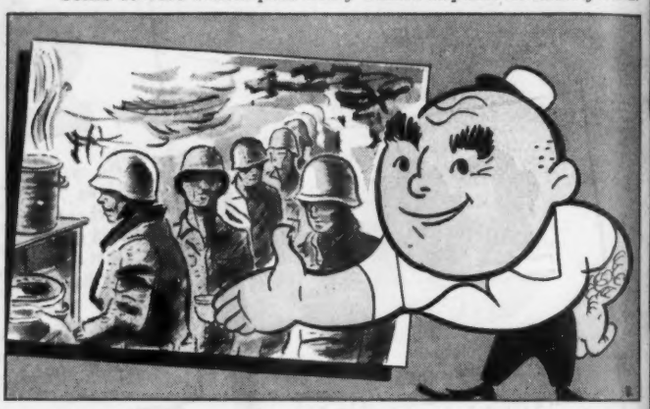
1 On battlefronts throughout the world Bundy tubing is seeing action. Army tanks, bulldozers and tractors use Bundyweld for gas, oil and brake lines as do armored reconnaissance cars, weapon carriers and many other vehicles.



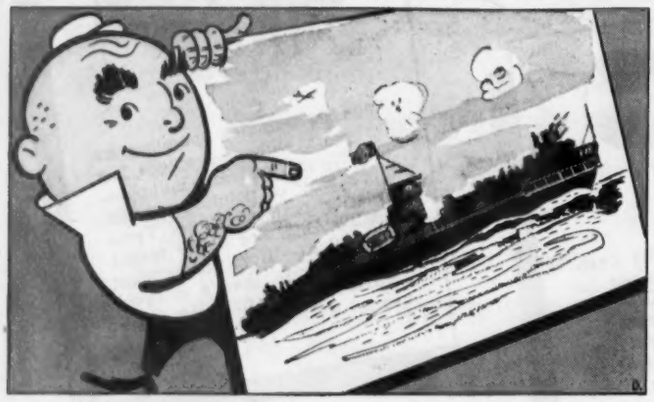
2 All types of fighting equipment use Bundyweld . . . from jeeps to planes, from tank destroyers to parachutes. Army trucks including Diesel cargo, oil service, gun tractor and bomb service trucks plus many others depend on Bundyweld.



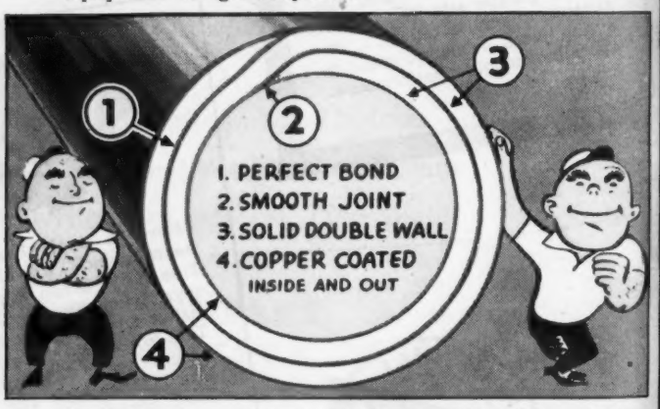
3 Ammunition for artillery depends on Bundy for percussion primers and burster tubes to set off the charge. Bundy tubing is also used for vital parts in incendiaries, bazookas, rocket bombs and other types of ammunition.



4 Hot rations are supplied to our men in battle from Army field stoves equipped with "life lines" of Bundy tubing. Food and water are kept cool and pure with refrigerating equipment using Bundyweld.



5 Diesel powered landing craft use Bundyweld for fuel and oil lines. Even smoke screens laid down by destroyers and PT boats depend on Bundy tubing! Planes, too, use Bundyweld for vital "life lines" and important primer tubes.



6 On land, at sea and in the air Bundyweld is giving constant proof of superior performance. For ways in which it can be used on your war or peacetime products, consult Bundy Research and Engineering Departments, Detroit 13, Mich.

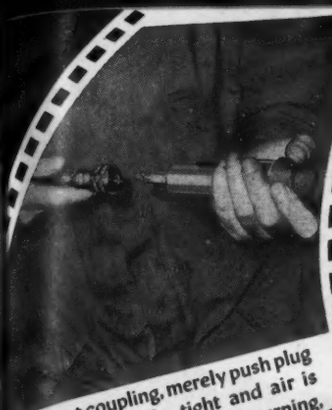
BUNDY TUBING

ENGINEERED TO YOUR EXPECTATIONS

BUNDY TUBING DISTRIBUTORS AND REPRESENTATIVES:

Pacific Metals Company, Ltd. 3100 19th Street San Francisco 10, California	Standard Tube Sales Corp. 1 Admiral Avenue Maspeth, New York City, N. Y.	Lapham-Hickey Company 3333 W. 47th Place Chicago 32, Illinois	Rutan & Company 112 South 16th Street Philadelphia 2, Pennsylvania	Eagle Metals Company 3628 East Marginal Way Seattle 4, Washington

HERE'S HOW EASY IT IS TO OPERATE HANSEN Push-tite COUPLINGS



To connect coupling, merely push plug into socket, it locks tight and air is automatically turned on, no turning, no twisting.

Note when coupling is in use, all parts are protected. No pins to bend, no exposed parts to jam or freeze.

To disconnect, slide sleeve back with thumb, plug is automatically released.

Air is automatically turned off the instant plug is released, consequently no wastage of air.

Hansen PUSH-TITE Couplings are simplicity personified, not only in design, but in handling and in operation. They are quicker and easier to connect and disconnect, are fool-proof, leak-proof, compact and sturdy. Handle pressures from 2 ounces to over 12,000 pounds.

Hansen PUSH-TITE couplings have earned their world-wide popularity on performance, saving time, effort and costly air. There's a Hansen coupling made to handle air, oil, grease, oxygen, acetylene and gasoline.

Send for free industrial catalog.

HANSEN MFG. CO.

1786 EAST 27th STREET • CLEVELAND 14, OHIO

WMBCo.

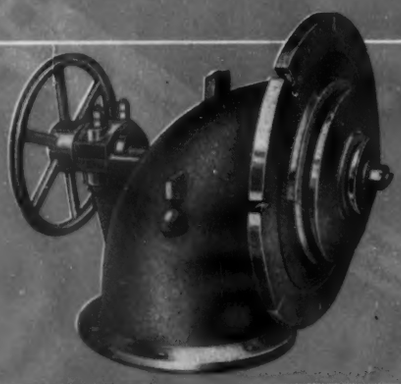
Bailey HAND OR MOTOR OPERATED BLOW OFF VALVES FOR BLAST FURNACE STOVES

MOTOR OPERATED

The Electric Motor again furnishes the power required for operation . . .

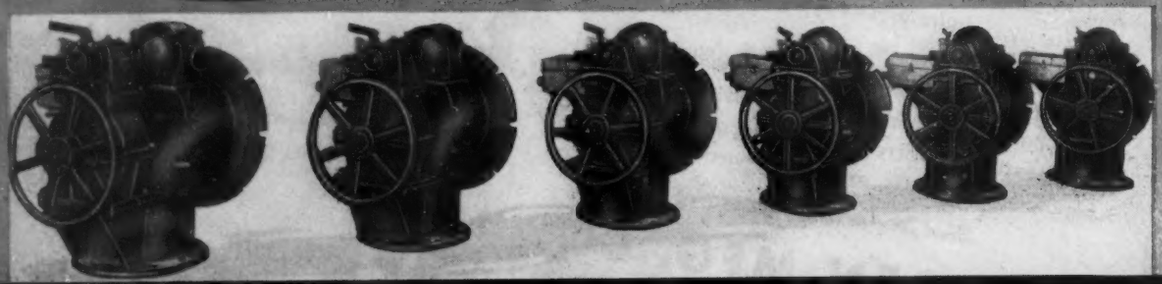
Electric Power is constantly relieving Workmen of the physical labor . . .

HAND OPERATED



Bailey Blow-Off Valves, hand or motor operated, dependably relieve pressure in Blast Furnace Hot Blast Stoves.

Showing a series of Bailey Blow-Off Valves—another definite step in Blast Furnace engineering.



WILLIAM M. BAILEY COMPANY *Engineers* PITTSBURGH, PENNSYLVANIA

Get Better Acquainted with MO-MAX

TRADE MARK REG. U.S. PAT. OFF.

THEY'RE ALL MO-MAX

"MO-CUT"	BRAEBURN ALLOY STEEL CORPORATION Braeburn, Pa.	"DI-MOL"	HENRY DISSTON & SONS, INC. Philadelphia, Pa.	"S. T. M."	SIMONDS SAW & STEEL COMPANY Lockport, N. Y.
"MOHICAN"	CANADIAN ATLAS STEELS, LTD. Welland, Ont.	"REX T-MO"	HALCOMB STEEL COMPANY Syracuse, N. Y.	"MO-TUNG"	UNIVERSAL-CYCLOPS STEEL CORPORATION Bridgeville, Pa.
"STAR MAX"	CARPENTER STEEL COMPANY Reading, Pa.	"MOGUL"	JESSOP STEEL COMPANY Washington, Pa.	"8-N-2"	VANADIUM-ALLOYS STEEL COMPANY Latrobe, Pa.
"LMW"	ALLEGHENY LUDLUM STEEL CORPORATION Pittsburgh, Pa.	"MOLITE 8"	COLUMBIA TOOL STEEL COMPANY Chicago Heights, Ill.	"TATMO"	LATROBE ELECTRIC STEEL COMPANY Latrobe, Pa.	"VUL-MO"	VULCAN CRUCIBLE STEEL COMPANY Aliquippa, Pa.
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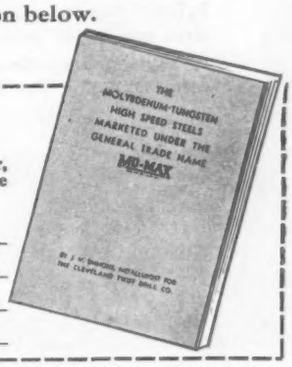

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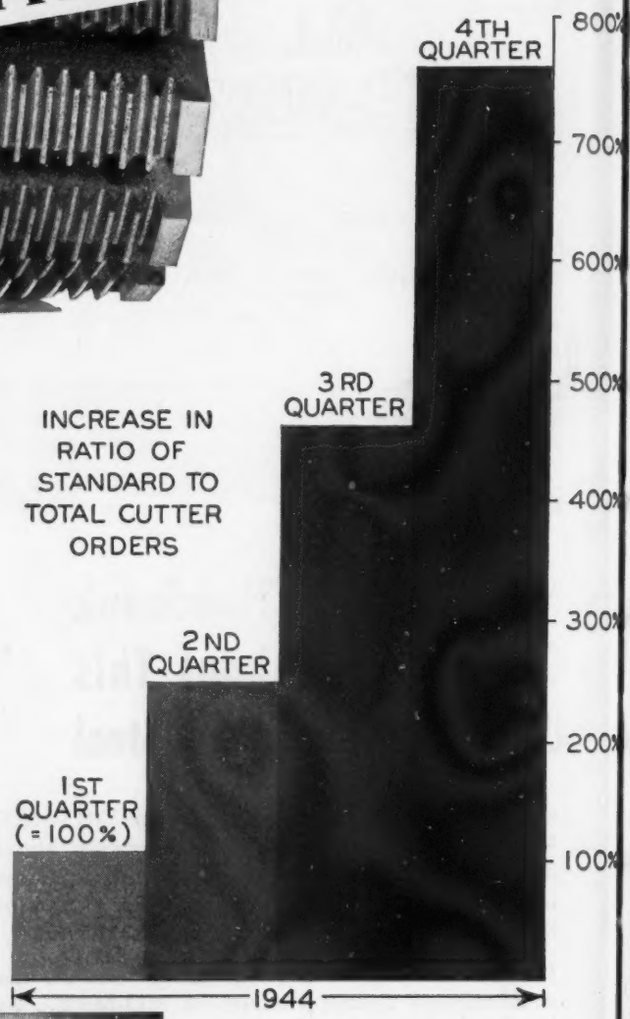

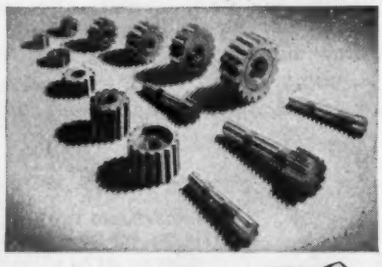

We will be glad to send you a Bulletin showing standard blank sizes and types carried in stock and giving complete ordering information. Ask for Bulletin No. CB-43.

*Despite the rapidly increasing demand for such tools, delivery time on Standard cutters was actually less at the end than at the beginning of 1944.

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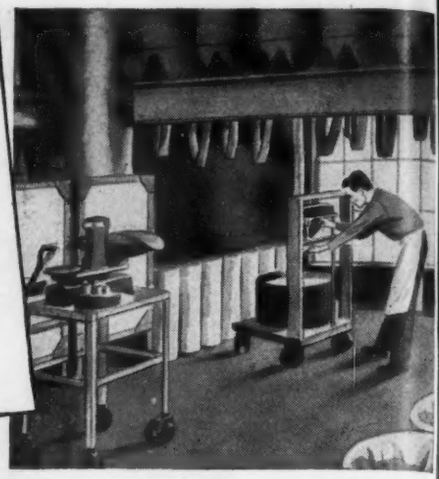

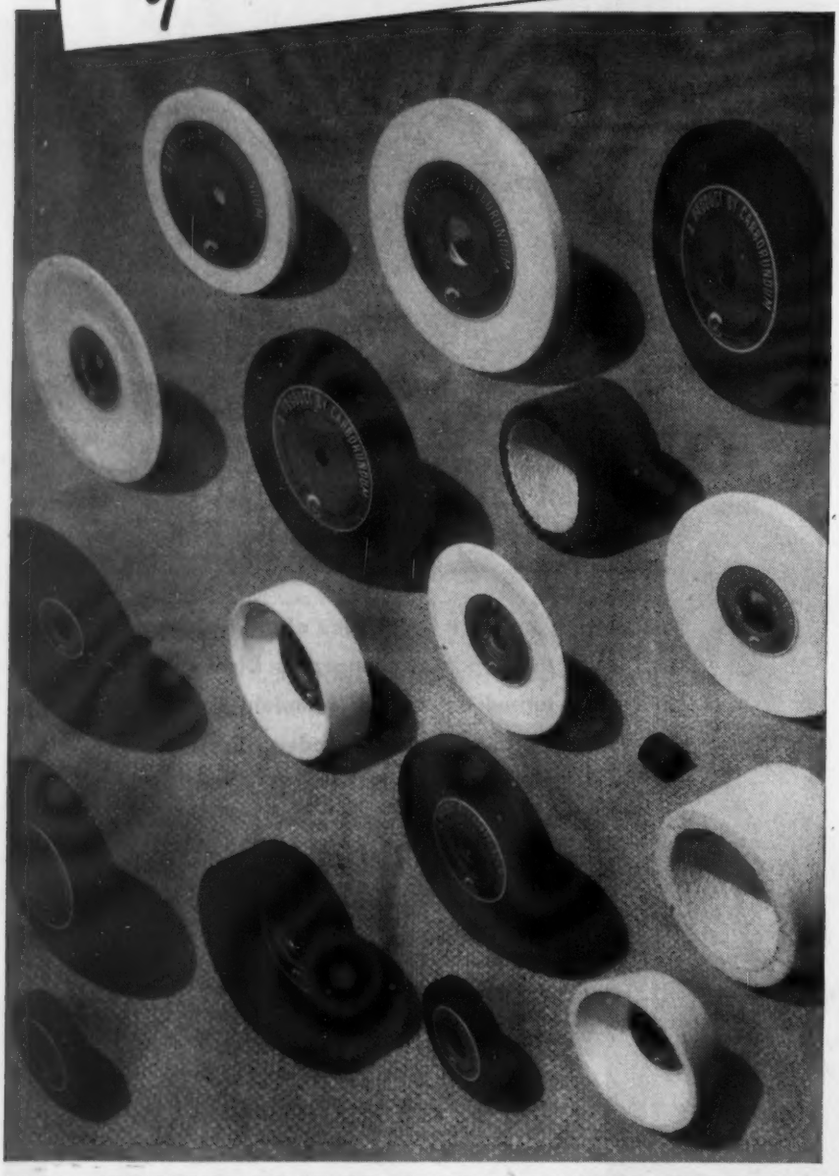

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You're seen the answer many times—in metal roadside signs—pierced by rifle or shot gun slugs, or dented by rocks—chipped and rusting away.

That's what the bullet test has to do with paint adherence—and is the reason for the test illustrated above. Here's the anwer to an old and troublesome problem—that of securing tight and lasting adherence of a film of paint to a zinc coated surface.

Figure 2 shows what happens to the painted surfaces (front and back) of a hot galvanized steel sheet when pierced by a bullet.

Now look at Figure 1. It was painted with the same paint and given the same bullet test—but notice how the paint held. That's because it was painted on Republic ELECTRO PAINTLOK.

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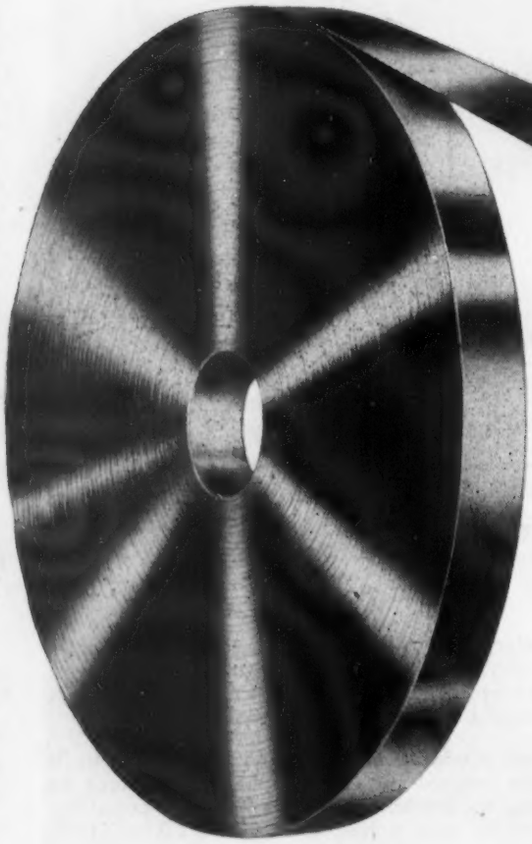

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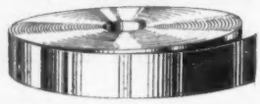
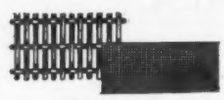


FLAT WIRE

ELECTRICAL WIRES AND CABLES



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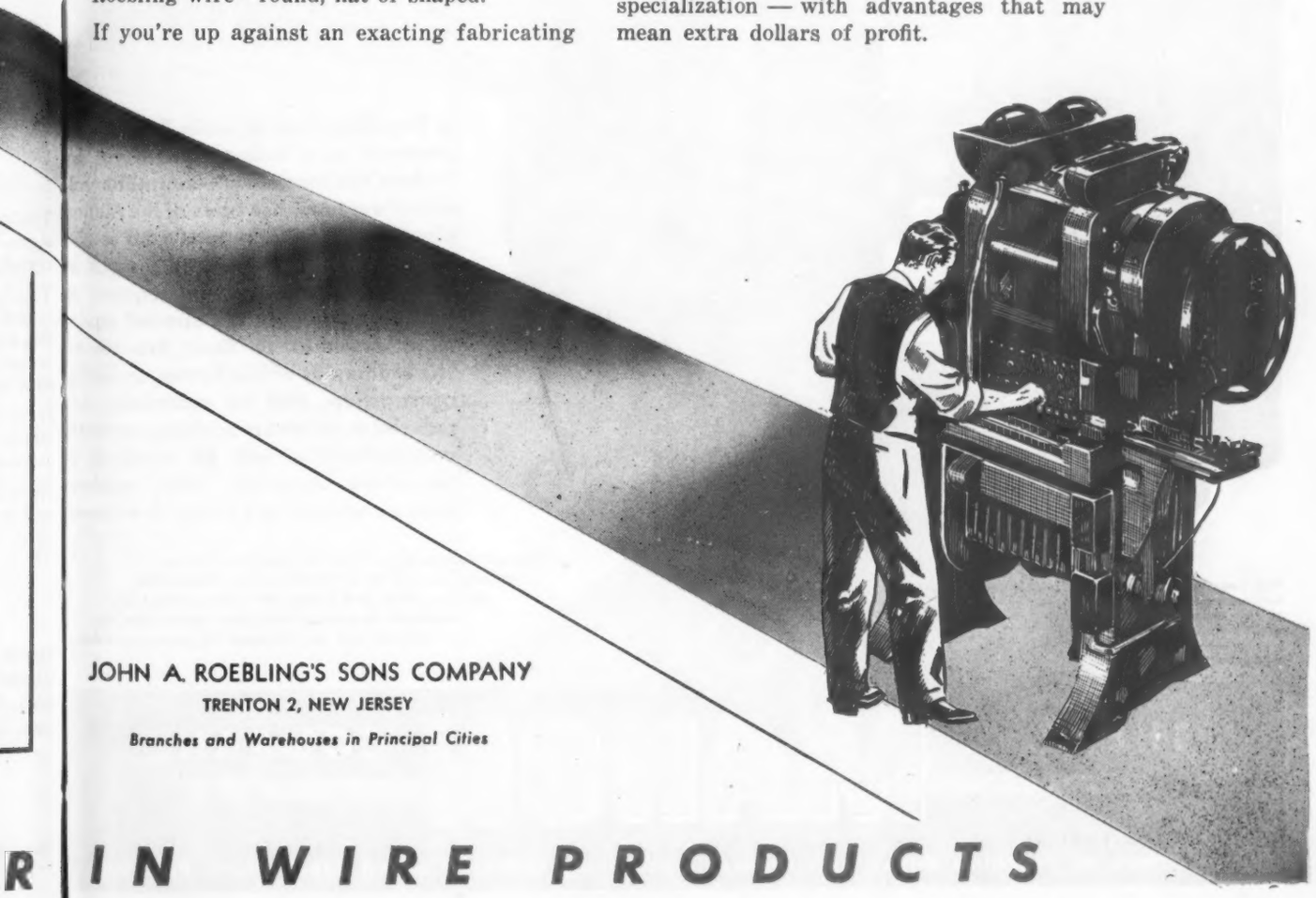
Get into the habit of first calling in your Roebling engineer—it pays! He can tell you what's available, and what's likely to be soon. You will share 100 years of experience in wire specialization — with advantages that may mean extra dollars of profit.



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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 116. NO. 11 March 12, 1945

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New Developments in Light-Gage Steel Construction
Controlled Low-Temperature Stress Relief for Weldments

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STEEL
March 12, 1945

An Opportunity for Industry!

John Lewis seeks a royalty of 10 cents per ton on coal to be placed in the treasury of the United Mine Workers to provide hospital and insurance funds for its members . . . . Paul Hoffman's Committee for Economic Development has enlisted thousands of industrial and business executives in a powerful drive to increase sales and production from 30 to 45 per cent above 1940 levels . . . With few exceptions, industrial corporations are putting aside a substantial portion of their earnings after taxes as a reserve for "contingencies and postwar adjustments" . . . . The government has made it clear that a fundamental part of fourth-term policy is to key the economic system to a program of "full" employment.

Here are four movements, initiated independently by labor, industry and government and—strange as it may seem—all are pointed toward the same objective. John Lewis with his royalties, industry with its CED program and its reserves for postwar uses and the government with its policy of encouraging employment all are seeking the same goal, which is stability.

In a situation in which there is such unity of purpose as to objective, it should be possible to develop a higher degree of unity as to method than now exists. The leaders of labor, of industry and of government might well pause and ask themselves whether the present state of confusion, suspicion and belligerency over matters pertaining to ultimate stability is really necessary. If all factions are driving sincerely for the same objective, why not tackle the job more co-operatively?

We believe American industry has a wonderful opportunity to take the initiative in this movement. It can do this by determining now to make a thorough study of the problem of stability of operations with a view of translating industry's potentials for stability into terms of a minimum annual wage for its employes.

Admittedly the problem of insuring a stable income is most difficult. It involves numerous variables and uncertainties over which industry has no control. Nevertheless, the trend in national thinking toward a guaranteed income or its equivalent is unmistakable. Something of this kind is inevitable. Isn't it better for industry to try to find a sensible solution of this problem than to have a hastily-concocted guaranteed wage program forced down its throat by government and labor, supported by public opinion?

An honest effort by industry to tackle this problem now would be a stroke of brilliant business statesmanship.

IMPORTANT BUSINESS: We commend for careful study by industrialists the testimony being presented at the "light metal" hearings conducted by the Senate Special Committee on Small Business. Currently the discussions deal with the disposition of the government's aluminum and magnesium plants, but the questions involved are applicable to the disposal of other types of government-owned facilities.

In scanning the testimony, one is impressed with the tremendous power possessed by the government for shaping the destiny of American industry. Indiscriminate use of this power could ruin entire industries within a year. On the other hand, discretion and foresightedness could spell unprecedented opportunity for them.

Typical of the hard nuts to be cracked are these: To insure healthful competition, must the government sell aluminum and magnesium producing facilities to companies not now engaged in this business?

(OVER)

Should or should not a producer be permitted to compete with its customer fabricators? How can rates for government-generated electricity (TVA, for instance) be fixed to insure equal competitive advantages to all private consumers?

These are just a few of the problems developed in the preliminary discussions on light metals. These and many more will bob up in the disposal of steel, airplane, ship, machine tool and other manufacturing facilities. —p. 82

• • •

OFF TO GOOD START: Henry Wallace seems to be tackling his new job as secretary of commerce with commendable restraint. His friends say he is going to sit tight for about 60 days to learn the ropes and to map out policy. His appointments to an advisory committee to make suggestions consist of progressive business men.

We did not favor the appointment of Mr. Wallace to this post because his past statements showed a lack of understanding of industry's problems and because there were numerous other persons capable of doing the job excellently without having to spend months studying and learning about its requirements. However, his appointment has been confirmed, he is on the job and he has evinced a determination to restore the department to a position of useful service to the nation.

Under these circumstances, this publication wishes him success in his new undertaking and pledges its support for every constructive move that he initiates. —p. 76

• • •

TOO MUCH CONFUSION: WPB is moving rapidly to adapt its intricate machinery to the changed situation resulting from the recent spurt of directives issued by the various military procurement agencies. Last week the board called upon industry to cancel all purchase orders on steel mills which have been invalidated by war production program adjustments. At the same time WPB stated that directives designed to bring about sudden production changes—such as those which caused so much confusion recently—will be held to a minimum.

A new adjustment policy also has been announced which requires procurement agencies to notify contractors of work termination at least seven days in advance of cut-off date when the cutback involves more than $100,000 a month in any one month of the following year.

These correctives may help appreciably, but there still is room for simplification in this complicated procedure. —pp. 77, 80

WOUNDED VETS WORK: At Crile General hospital in Cleveland, 400 of the 1800 wounded war veterans receiving medical and therapeutic treatment are on the payroll of the Lamson & Sessions Co., manufacturer of bolts, nuts, cotters and cap screws.

Fifty of the 400 are ambulatory patients who work three hours a day at machines in the hospital's 40 x 80-foot shop. The other 350 veterans perform work which can be done in the wards in which they are confined. All are paid at a uniform rate of 75 cents per hour.

The story of how industry is co-operating with army hospital authorities in this realistic rehabilitation program is inspiring. Experience at Crile shows that the work actually assists in the recovery of the patients and helps the employer to fulfill his war contracts. The entire set-up is gratifying from every standpoint.

With 90,000 men a month now being sent home from the various theaters of war, this kind of rehabilitation is exceedingly important. The current article will be followed by two more on the same subject. —p. 73

• • •

FLOODS UNNECESSARY: Through a curious coincidence of events, the present flood in the Ohio Valley carries this writer's mind to the scene of General Patton's latest exploits in Germany.

The Moselle river is similar to the Monongahela in width and current and to the Allegheny as to the hills through which it passes. The Rhine from Coblenz to Cologne resembles the Ohio above Cincinnati. That one seldom hears of disastrous floods in these German rivers is because the upper reaches of their watersheds are heavily forested. German municipalities own and patrol millions of acres of forests, amply protected by plowed fire breaks.

Apparently our nation still is too young to appreciate the value of conservation of this kind. Someday we will have patrolled forests on hills above the Allegheny, Monongahela, Clarion, Kiskiminetas, Conemaugh, Youghiogheny, Mahoning, Shenango and Beaver rivers. When that time comes, floods will not endanger industrial production nor will Youngstown, Johnstown and other cities worry constantly about the menace of a water famine. —p. 80

E. L. Shaner

EDITOR-IN-CHIEF

Spheroid Floats—

Another Wartime Use of Inland Steel

Guarding America's great harbors is a small Navy within the Navy—the men and tenders who handle the antisubmarine and antitorpedo nets. These nets, often more than two miles long, are supported by spheroid floats. A great number of these floats, which are 58 in. in diameter, are made by welding together preformed segments that are cut from Inland plates.

The plates shipped for this purpose by Inland not only measure up to specifications, but they are delivered on schedule, assuring uninterrupted production, low manufacturing cost, and on-time delivery of floats to the Army and the Navy.

Meeting customers' manufacturing schedules is an Inland tradition, which we have done our best to maintain even in the face of the heavy demands and changing needs of wartime production. This principle of punctuality begins when an order is taken—and follows through the order department, the metallurgical department, Inland's modern mills, and the traffic department. To Inland, every order calls not only for high uniform quality but for cooperative service as well.

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Ryerson selected the 8600 and 8700 series alloys at the start of the NE (National Emergency Alloy) program. Large stocks have been built up and a full range of sizes are available for quick delivery from Ryerson stock.

On all Ryerson alloys you get this plus service: With each shipment of alloy steel, you receive a report, which includes chemical analysis, grain size, working temperatures, Jominy Hardenability Test results, and physical properties interpreted from hardenability for various sized rounds quenched and tempered at three different draw temperatures. The report pertains specifically to the heat of alloy delivered. All bars are identified according to heat, with painted color markings and stamped heat symbols, which correspond to the identification noted on the report.

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Industry Aids in Restoring Wounded Veterans to Health

Cleveland manufacturers install machinery, supply materials and supervision in shop at Crile General hospital, Cleveland. Disabled men given chance to learn and earn while they heal. Produce war materials to aid buddies still on the fighting fronts

By VANCE BELL
Assistant Editor, STEEL

To exercise his left arm, this man grasps the file handle with his left hand rather than with his right while die filing. This graphically illustrates that rehabilitation rather than quantity production is of first importance. Photo by Howard Mazerve

INDUSTRY, which for more than three years has been devoting its whole effort to supplying American boys on the fighting fronts with the materials necessary to win, now is following through on another vitally important job—that of rehabilitating wounded and returned veterans.

The scope of the rehabilitation task is awesome. Approximately 90,000 men a month now are being sent home from the various theaters of war. After Germany falls, this figure may rise to 200,000 or 250,000 a month, about half of whom are expected to have physical disabilities.

Long periods of medical treatment and occupational therapy will be necessary before many of these men can assume their useful place in society. Many of them entered the armed services direct from school and never have held a full-time job in private industry. In addition to recuperating physically they must acquire the knowledge and skill necessary to hold a job.

All these requirements are being met in a realistic rehabilitation program at Crile General hospital, Cleveland, where wounded veterans are receiving medical and therapeutic treatment and at the same time are gaining industrial experience producing goods to help their buddies finish the war. And they are being paid for it. The program is made possible by the active co-operation of Cleveland industries. Soon after Crile hospital was opened a year ago Capt. Max Goldenberg, 31-year-old chief of the institution's program of physical and mental reconditioning, suggested at a veterans' re-employment meeting of the Associated Industries of Cleveland that recovery of the wounded veterans could be speeded if gainful employment for them could be provided at the hospital. The suggestion interested the association which already had a veterans rehabilitation committee headed by Clarence L. Collens, president, Reliance Electric & Engineering Co., Cleveland.

Lamson & Sessions Co., manufacturer of bolts, nuts, cotters and cap screws, was selected to start the project because it had the necessary machinery immediately available and because the company's processes were adaptable to the hospital's needs. The company installed about a dozen light machines in a shop at the hospital, provided the materials and supervision necessary and offered employment for limited periods daily to the patients. Work was provided for the wounded veterans even though some of them were unable to walk or operate the machines. Hand work was taken to soldiers' beds or to the wards in which they were confined. At present about 400 of the hospital's 1800 patients are on the Lamson & Sessions payroll. Fifty ambulatory patients work in the 40 x 80-foot shop operating the various machines while the remaining 350 are engaged in ward work.

Work in the shop is carried on from 8:30 to 11:30 a.m. and both shop and ward work from 1:30 to 4:30 p.m. The veterans are paid a uniform rate of 75 cents an hour.

Crile hospital's industrial therapy project is one of three such programs in the United States, the others being conducted at Brooklyn Naval hospital, Brooklyn, N. Y., and at Birmingham General hospital, Van Nuys, Calif.

To prevent patients from becoming too enthusiastic and overworking themselves, the hospital limits working time to such periods as the patient is physically able to stand and in no case permits more than three hours of work daily.

Under the occupational therapy program the hands, feet, arms or legs of the patients are exercised for limited periods daily. One of the newer concepts of medical science is that if the occupation is one of gainful employ-

In this shop at Crile General hospital ambulatory patients work, learn, and earn while they heal. Equipment for the work was installed by Lamson & Sessions Co. Photo by Howard Mazerve

MAJ. ROY H. SMITH

ment the improvement in the patient's physical and mental condition will be speeded because the patient's mind becomes so engaged in what he is doing that he unconsciously relaxes the injured member and allows it to be used more fully, thus giving the needed exercise more effectively.

Medical science has found that in many instances a patient can regain all or most of the original use of an injured limb if the muscles are not allowed to atrophy beyond repair. As Crile hospital specializes in the treatment of orthopedic (bone and joint) and plastic rebuilding cases, exercise and occupational therapy play a highly important part in the treatment.

The project was started primarily to supplement physical therapy to aid the disabled veterans regain the use of arms and legs. It has proved to have added benefits for Lamson & Sessions in increasing its war production at a time when manpower is critically short. It is providing the further benefit of building good will among the veterans for the company and also for industry generally.

Impressions gained by the patients during the rehabilitation period at Crile hospital are expected by the program sponsors to be lasting ones. The boys now engaged in the program are enthusiastic over the chance to learn and earn while they heal. They are deeply appreciative to Lamson & Sessions and to the Associated Industries for the chance to work.

Boys Like Chance To Be Useful

Typical of the patients' attitude is that of Pvt. Francis T. Browning of Dorchester, Mass., who sustained a leg injury in Africa. Private Browning says the program "not only helps the fellows in the reconditioning program of the hospital but it has made the men in bed forget their wounds or injuries for three hours a day. It makes a fellow feel that even though he is bed-ridden he can still do something useful not only for himself but also for the war effort and it has unlimited possibilities when he returns to civilian life."

Lieut. John B. Shepard, Cincinnati, says: "There are two important ways in which the Lamson & Sessions industrial therapy program at Crile General hospital helps us, the fellows who are bed-ridden. It keeps us occupied so that our time seems to pass very quickly, lessening the hardship of having to lie in bed, and it allows the fellows to feel that in earning money the time is not completely lost."

No great job of selling was necessary to gain the co-operation of Lamson & Sessions in the project. H. J. McMahon, general plants manager for the company, is a member of the veterans re-employment committee of the Associated Industries and long has been aware that rehabilitation and re-employment of veterans is becoming an increasingly important problem for industry. Maj. Roy H. Smith, president, and George S. Case Sr., chairman, of Lamson & Sessions are equally enthusiastic. Major Smith, a veteran of World War I, has one son in the Army and one in the Navy, while Mr. Case has a son in the Navy. Major Smith points out that the company's primary aim in undertaking the project was to aid the wounded soldiers in oc-

Patients who are physically unable to work in the industrial therapy shop at Crile General hospital do light work in their wards for Lamson & Sessions Co. This type of work exercises hands and fingers. Photo by Howard Mazerve

GEORGE S. CASE SR.

cupational therapy and for no other purpose. That there have been collateral benefits to the company's war production program has been gratifying to company officials, but this has been only incidental and not an object of the program.

"Our machinery was all equipped for operation with the right hand or the right foot," explained Major Smith. "Where necessary we have made modifications to provide exercise for left hand and left foot.

"No machinery or no process has been installed unless it was considered to have a definite place in the exercise or coordination of muscles of the hand, foot or eye.

"We are pleased, indeed, that the program has contributed to the meeting of our orders for vital material and that both the quantity of production and its quality have been excellent. But our principal satisfaction comes from the statement of Captain Goldenberg that there has been a measurable improvement in the patients so employed."

Industry generally has a keen interest in the rehabilitation program, reports Chester Nikodym, general manager of Associated Industries. "That became apparent immediately when the Associated Industries began an intensive study of the problems related to re-employment of returned soldiers last spring.

"We were fortunate in having the help of capable medical and military authorities from Crile hospital to give us the information. Out of contacts thus established came our agreement to present the matter to local manufacturers who could actively co-operate in establishing this new occupational therapy work. Naturally we were glad to have a hand in such a worthy undertaking."

Program To Be Expanded

The industrial therapy program at Crile hospital is on the threshold of expansion, with Reliance Electric & Engineering Co., Cleveland, entering the project. For that firm, patients will do wire bending.

While occupational therapy for veterans is broad in scope it is but one phase of industry's overall program of assisting veterans. Programs already under way or planned give evidence that industry realizes its responsibility to have ready as needed all practical plans for readjustment and return of veterans to civilian life. To mention only a few of the programs, some employers are training supervisory employes how to handle returning veterans, many firms are planning new products in an effort to provide full employment, and other companies are having their medical departments study and prepare to deal with physical and mental problems that will arise among men who have been in overseas service.

That the problem of rehabilitating injured veterans is a formidable one is attested by announcement by the War Department that sick and wounded soldiers from overseas are now arriving at the rate of 50 every hour. Thus 36,000, or better than one-third of all the men returning each month from the Army are definitely in need of some form of rehabilitating.

This is the first of a series of three articles on the veterans rehabilitation program at Crile General hospital. The second will appear in the March 19 issue.

Opportunity Seen Open to Wallace To Chart Course of Business

Removal of RFC lending agencies from Commerce Department not expected to hamper new secretary in his effort to put some of his economic theories into practice. Office still wields vast influence and authority

DESPITE the effect of the George bill depriving the new secretary of commerce, Henry A. Wallace, of power over lending agencies of the RFC, consensus among Washington observers is that Mr. Wallace will not be much hampered by this restriction in his effort to put some of his economic theories into practice.

The secretary of commerce has a vast amount of influence and authority. No recent incumbent of the office has exercised his full powers. The opportunity is open to Mr. Wallace to chart a course that may have significant effects in influencing the development of American business.

As secretary of commerce, Mr. Wallace will have supervision over the Bureau of the Census which makes studies and surveys, and reports data which guide business men in making their plans. He will have supervision over the Bureau of Foreign and Domestic Commerce, whose influence in directing development of the economy may be made much more forceful than in the past. He will direct the National Bureau of Standards which, many students have felt, could be utilized very effectively for bringing pressures on business and industry. He will direct the Patent Office which could be used to a large extent toward the same objective. He will supervise the Civil Aeronautics Administration and the Civil Aeronautics Board, organizations that will be highly important in shaping the future of civilian aeronautics in the United States. In addition, he will direct the Coast and Geodetic Survey, the Inland Waterways Corp., the Weather Bureau and the National Inventors Council.

Not only do these various agencies have direct contacts in which they can influence the development of American business, but they can be of great potential importance in their indirect influences.

Mr. Wallace's first statement to the press, after he had been sworn into office, contained a fair reflection of his leanings.

"The Department of Commerce," it read, "will continue to aid the war effort, and it will likewise do its full part to facilitate maximum co-operation between the nation's employes, investors, business, agriculture, and government to the end that all America, our assets and our people, may be busily and profitably employed."

Henry Wallace, new secretary of commerce, shown embracing Sen. Claude Pepper (Dem., Fla.), one of his most ardent supporters, at the recent hearing of the Senate on Wallace's appointment. Although the commerce secretaryship was stripped of control over the Reconstruction Finance Corp. and other government lending agencies following the nomination of Wallace, the new secretary will retain a vast amount of influence and power in the office. NEA photo

NAMED TO NEW POSTS

The Senate last week confirmed appointment of Fred M. Vinson as federal loan administrator succeeding Jesse H. Jones. Judge Vinson has been director of the Office of Stabilization. In his new post he will head up the newly constituted Federal Loan Agency which takes in the Reconstruction Finance Corp. and other government lending agencies. Congress divorced these agencies from the Department of Commerce following the naming of Henry Wallace to be secretary of commerce.

Following confirmation of Judge Vinson to the loan agency, the White House announced appointment of William H. Davis, present chairman of the War Labor Board, to succeed to the post of stabilization director. Mr. Davis will be succeeded as chairman of the War Labor Board by George W. Taylor who has been serving as vice chairman of that board.

In this initial statement, Mr. Wallace reflected his disposition to look after the American economy in general. He gave no indication of any belief on his part that in his office as secretary of commerce he should act as the special proponent of business and industry in the government. His statement indicated an approach which might mean overlapping the responsibilities of the present Secretaries of Labor and Agriculture, and the Securities and Exchange Commission—and what Mr. Wallace has in mind here must be considered in the light of the many unfavorable remarks about big business which he has expressed in the past. Even in referring to small business, it will be noted, Mr. Wallace was careful to say that he proposes to enable small business "to do its full share in furnishing maximum employment postwar."

Certainly, in appointing his first committee, to make suggestions to enable small business to do its full share in furnishing maximum employment postwar, Mr. Wallace picked good men, as follows:

Edward E. Brown, president, First National Bank, Chicago; Prentiss M. Brown, chairman, Detroit Edison Co.; Eric A. Johnston, president, Chamber of Commerce of the United States; Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt.; John W. Snyder, vice president, First National Bank of St. Louis; Ernest G. Draper, a governor of the Federal Reserve system; and Stacy May, economist, McGraw-Hill Publishing Co., New York.

It remains to be seen, however, whether Mr. Wallace pursues a line of action in harmony with these typical American

business leaders or whether his close contact for a long time past with CIO leaders and other "liberal thinkers" will cause him to work for so-called "reforms" in the American economic system.

A number of moves now under contemplation would, if they materialize, give Mr. Wallace much greater powers than he enjoys under the present responsibilities of his office. One is to move the Foreign Economic Administration, with vast ramifications in the foreign fields of business, into the Department of Commerce. Another would put the Smaller War Plants Corp., the government's small business financing agency, under the secretary of commerce.

It is of interest to note that appointment of Mr. Wallace as secretary of commerce comes simultaneously with a strong trend among "liberal" economists to resume and push to conclusion the studies that were conducted by the old Temporary National Economic Committee which was headed by Senator Joseph C. O'Mahoney (Dem., Wyo.). This move already has brought about a series of hearings by the Senate Small Business Committee at which testimony so far strongly favors disposition of government-owned aluminum and magnesium plants to "small" interests.

In the shaping of postwar policy in regard to business and industry, the secretary of commerce can exert great influence. If he cannot do it directly, he has such powerful instruments as Census, the Bureau of Standards and other agencies under his supervision.

Renew "Reformation" of Business

Just how Mr. Wallace will function in his new capacity remains to be seen. In general, it is safe to predict that he will use his new authority to help bring about an economic system intended to insure full employment at good wages in the postwar period. Mr. Wallace is prejudiced against big business; at the same time he professes friendship for the investor, and for little business. His program would be implemented through establishment of a system of government controls over business, with extensive government financing of "private enterprise."

In other words, he will seek to push to conclusion the attempts to "reform" American business which were interrupted by the war.

Just how much assistance Mr. Wallace, as secretary of commerce, will be able to extend to those who aim at further reforming the American business system is a subject for speculation among Washington observers who recall the congressional opposition that greeted his appointment. The mere fact that Mr. Wallace favors certain measures easily might bring about their defeat in Congress. Perhaps the most significant thing about his appointment is that he has become a symbol, a rallying-post for those who want to reform our business system.

WPB Moves To Clear Invalidated Tonnage from Steel Mill Books

TO ASSURE maximum effective use of steel producing facilities, the War Production Board last week called upon industry to cancel all purchase orders that have been placed on steel mills and are not now valid because of production program adjustments.

During recent months military procurement programs have been drastically altered. Demands of the armed forces for materiel have changed greatly since December, 1944.

The reduction of many production programs necessitated by second quarter 1945 steel allotments being lower than stated requirements tends to make the steel mill position more complex.

WPB officials stressed the fact orders for large quantities of steel—chiefly sheet and strip—are now awaiting placement but that no action can be taken until mill schedules can make room for them.

WPB field officers have been instructed to contact at once steel users whose programs have been cut and to work with them to assure that invalidated steel orders are canceled and that any unused allotments of steel are returned promptly in compliance with Controlled Materials-Plan regulations.

At the same time WPB officials said that use of directives designed to bring about quick production adjustments but which sometimes tend to upset production schedules and reduce total output of mills will be kept at a minimum.

Under this plan, if it is contemplated that a directive be issued, the following information must be obtained from the mill involved: 1. inventory position; 2. orders on schedule; 3. material in transit; 4. proposed change-over date, taking into consideration production losses if delivery is not completed.

Present, Past and Pending

■ NEGOTIATE FOR FIRTH-STERLING STEEL STOCK

NEW YORK—Private investors headed by Lehman Bros. reported concluding negotiations for purchase of majority stock of Firth-Sterling Steel Co., McKeesport, Pa., from the English steelmakers, Thomas Firth & John Brown Ltd., Sheffield, England. Present management will be continued but expansion of business planned. The company manufactures tool, die, cutlery steels and sintered carbides.

■ OPEN PRODUCTION CAPACITY TO BE LISTED

WASHINGTON—Reports on available manufacturing capacity will be issued twice a month by WPB. These compilations are designed to assure maximum use for war production of all available plants. Military services will check list of open capacity plants prior to placement of any direct war contracts.

■ LARGE STEEL TONNAGE LOST THROUGH STRIKES

CHICAGO—Production of 19,760 net tons of steel ingots was lost in this district the week ended March 3 as result of strikes at two plants. This was almost 6 per cent of the district's weekly capacity. Of total, Carnegie-Illinois Steel Corp. lost 9000 tons and Youngstown Sheet & Tube Co. 10,760 tons.

■ H. E. MACK, LASALLE STEEL CO. VICE PRESIDENT, DIES

CHICAGO—H. E. Mack, 64, vice president in charge of metallurgical engineering, LaSalle Steel Co., died March 7. He had been associated with the company since 1918, serving successively as superintendent, manager of the Detroit sales office, sales manager and vice president.

■ CONSERVATION AND SALVAGE ACTIVITIES COMBINED

WASHINGTON—Activities of the Office of Conservation Officer and the Salvage Division, WPB, have been combined under a new Conservation and Salvage Division, headed by W. Thomas Hoyt, who was director of the Salvage Division.

■ FEBRUARY PLANE OUTPUT AGAIN BELOW SCHEDULE

WASHINGTON—February aircraft output totaled 6286 planes, or almost 3 per cent behind schedule and marked the fourth consecutive month of under-schedule production.

■ NEW BRASS ROD MILL IN INDIANA PLANNED

HAMMOND, IND.—Agreement with Defense Plant Corp. to equip and operate a $5,851,733 brass rod mill here with capacity of 20 million pounds monthly, was announced last week by the Phelps Dodge Copper Products Corp., New York.

Breakdown of Steel Mill Product Shipments to the Construct

(Net Tons)

Products	1944*	1943	1942	1941	1940	1939	1938	1937	1936
Semifinished (ingots, blooms, billets, slabs tube rounds, sheet and tin bars)	46,400	48,210	31,624	35,649	21,431				
Structural shapes and sheet piling	771,000	769,990	2,215,307	2,675,083	1,682,208	1,550,761	1,078,382	1,376,6	373,90
Plates (universal and sheared)	789,000	978,753	1,474,535	1,086,093	805,004	590,897	479,731	438,9	455,50
Rails—60 lbs. and over	20,000	36,218	100,076	85,526					
All other rails	16,300	16,570	28,806	20,399					5,96
Total rails	36,300	52,788	128,882	105,925	33,556	7,601	5,838	9,8	
Tie plates and track accessories (incl. track spikes)	15,500	18,846	52,232	34,831	14,864	1,642	1,239	2,1	1,53
Hot-rolled bars (carbon, incl. hoops and bands)	348,000	343,519	552,121	505,865	289 970				563,97
Concrete reinforcing bars	282,000	266,207	1,322,272	1,198,441	737,654	651,129	476,624	442,7	
Alloy bars	15,000	17,311	6,116	11,262	9,239				
Cold finished (carbon and alloy)	7,500	6,654	4,359	5,975					866,20
Total bars	652,500	633,691	1,884,868	1,721,543	1,036,863	1,003,053	639,461	751,3	28,13
Pipe and tubes	306,000	384,278	555,301	543,654	246,765	163,914	194,796	33,6	
Wire rods	16,500	17,956	38,186	34,532	19,819				215,41
Wire and wire products (incl. fence posts)	161,000	244,732	664,928	364,182	166,241	250,481	205,888	203,6	3,00
Black plate	8,500	2,717	13,311	4,206	3,495	8,088	7,075	2,3	
Tin and terne plate (hot and cold reduced)	2,500	928	5,622	14,285	9,908				
Sheet and strip:									
Hot-rolled	1,280,500	911,287	1,066,313	816,382	482,817				
Cold reduced	145,500	81,247	135,507	158,503	97,825				178,90
Galvanized	240,000	146,854	230,257	392,666	273,045	236,588	155,812	164,4	
All other		73,550	3,433	7,986	6,341				511,74
Total	1,666,000	1,212,938	1,435,510	1,375,537	860,028	667,917	426,178	479,1	
Tool steel bars	950	682	1,053	1,589	1,065				
Wheels and axles	8,300	6,857	5,389	9,035					
Forgings		5,357	3,793	4,633					
Steel castings		16,257	16,393	2,489					60,58
All other steel products	1,200	14,033	43,908	39,071	66,737	104,595	56,825	34,7	521,99
Grand Total	4,481,650	4,409,013	8,570,842	8,052,337	4,967,984	4,348,949	3,093,814	3,332,4	

*Estimated. Figures for 1926-39 compiled by STEEL; for 1940-43 by American Iron and Steel Institute.

War Developments Hold Key to 1945 Trend in Building Activity

TREND in construction throughout 1945 is dependent largely on the progress of the European war. In general a further sharp drop in building activity is indicated if the fighting on both fronts continues throughout the year. Should V-E Day occur before July 1, construction will probably record little change from the overall volume of $3.8 billion reported last year.

Assuming the war in Europe and Pacific theaters continues throughout 1945, the indicated volume of construction for this year is expected to total $3.3 billion, or the lowest since 1935, the War Production Board states.

This estimated construction activity represents 82 per cent of the 1944 volume and 24 per cent of the peak 1942 performance. It is believed that about half the volume this year will be accounted for by privately-financed work, contrasted with 40 per cent in 1944 and 20 per cent in 1942 and 1943, the board estimates.

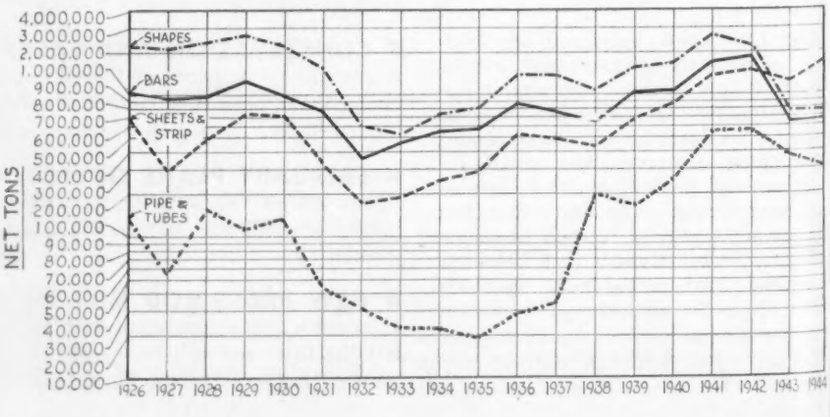
Construction activity generated by purely military requirements is expected to decline about one-third this year, both for industrial and non-industrial work. Activity in the construction categories for essential civilian and indirect war purposes will probably remain at about the same level as last year, with an estimated decline in new housing volume being offset by increased non-military work in the industrial field and other non-residential categories.

WPB estimates 1945 military construction will decline from $730 million to $450 million, and government-financed plant construction from $745 million to $470 million. Privately-financed factory construction in 1945 is estimated at $250 million, a 7 per cent increase over the 1944 level. Overall housing volume is expected to decline from $690 million to $500 million, or 28 per cent under the 1944 volume.

The construction industry will be an important factor in easing unemployment during the immediate postwar years. The industry has practically no reconversion problem (outside of some slight delay in a few manufacturing lines) to prevent it from immediately tackling the job of satisfying the huge pent-up demand for new homes, public works, commercial buildings and health and educational institutions.

However, from 3 to 6 months are believed necessary to produce supplies adequate in quantity and variety, of such

STEEL FOR CONSTRUCTION 50% BELOW 1942 PEAK



dustry by Product Classification from 1926 Through 1944

(Net Tons)

1936	1935	1934	1933	1932	1931	1930	1929	1928	1927	1926
373,906	806,129	723,808	515,487	600,955	1,530,271	2,284,902	2,685,310	2,358,493	2,191,452	2,260,041
455,503	258,067	257,234	242,038	193,752	421,078	693,151	790,883	821,865	762,619	910,341
							4,375	2,674	7,864	2,892
							1,407	3,241	2,433	890
5,965	2,274	720	735	494	1,010	3,496	5,782	5,915	11,297	3,782
1,535	887	574	2,591	85	807	1,364	4,282	273	527	78,502
563,971	346,987	353,283	293,759	223,317	457,158	569,376	629,954	679,785	476,885	
866,206	575,397	542,862	456,472	367,914	754,062	967,053	1,227,032	973,697	937,878	1,035,082
28,130	19,667	22,573	26,535	32,303	44,707	132,490	113,446	157,317	58,150	136,027
215,418	162,845	135,779	132,588	105,924	173,540	223,269	212,855	130,091	110,963	142,784
3,002	3,538	3,412	1,386	1,648	1,121	1,981	403	5,566	1,123	
178,907	133,506	138,266	107,950	54,672	129,790	305,860	306,161	376,262	126,938	
511,746	284,485	247,467	188,744	173,316	322,197	706,394	738,556	587,789	297,209	696,249
60,584	32,262	35,822	22,539	11,023	22,576	39,187	31,484	79,649	94,482	106,661
521,996	2,145,853	1,970,255	1,579,116	1,487,414	3,271,368	5,053,306	5,810,033	5,120,655	4,464,818	5,371,469

fabricated items as metal windows, plumbing fixtures, heating equipment, and builders' hardware, once restrictions on production and use of construction materials are lifted.

An indication of the postwar construction potential is the F. W. Dodge Corp.'s list of 55,140 projects, estimated to cost about $11 billion, reported to be under consideration in the 37 eastern states. Of these projects 20,798, amounting to $5.1 billion, are in the design stage. These postwar projects include a preponderance of public construction.

During the past year the construction industry purchased an estimated 4,481,650 net tons of steel mill products. This represents less than half the steel tonnage distributed to the industry in the peak 1942 construction year, when steel purchases amounted to 8,570,842 tons.

Expressed in percentages of the overall steel mill shipments, the construction industry last year purchased 7.4 per cent of the total. In the prewar period 1929 through 1939 the industry's steel purchases averaged 13.9 per cent of the overall mill shipments annually. In the years 1940, 1941, 1942 and 1943, these percentages were 10.8, 13.0, 14.0 and 7.6 per cent, respectively.

The construction industry has purchased more sheets and strip than any other steel product the past two years; followed by plates, shapes and bars in the order named. In 1942 shapes represented the biggest tonnage item purchased by the industry, while bars and plates were in second and third position.

Shipbuilding Retains First Place As Steel Consumer During 1944

SHIPBUILDING in 1944 again was the nation's leading single consumer of steel, but not by as large a margin as in 1943, according to the American Iron and Steel Institute. Distribution among consuming industries of shipments totaled 60,353,000 tons of steel products during 1944. In 1943, distribution of 59,906,000 tons was reported.

Builders of merchant and naval vessels received 10,827,000 tons compared with 11,509,000 tons in 1943 and 9,440,000 tons in 1942. The tonnages going to shipyards represented 17 per cent of the total 1944 shipments against 19 per cent of the 1943 total and 15.6 per cent in 1942.

More steel was delivered last year than in 1943 to several major industry groups, including railroads, container manufacturers, agricultural equipment makers, and the oil, gas and mining industries.

A slight decline was indicated in the combined tonnage for such war uses as ordnance, projectiles, tanks, and export to allied and friendly nations. The decline resulted from reductions in exports which, for security reasons, are combined with certain war uses in the Institute's report. Nearly 12,875,000 tons were shipped under that combined category in 1944, as against 14,200,000 tons in 1943.

Jobbers received 8,008,000 tons in 1944, 13 per cent of total shipments, against 6,824,000 tons in 1943. The railroad industry received 5,425,000 tons, or 9 per cent compared with 4,527,000 tons the year before.

Two per cent of 1944 shipments went to agricultural implement and equipment manufacturers, 1,092,000 tons against 1943 shipments of 713,000 tons.

Container manufacturers received 3,696,000 tons or about 6 per cent of the total. That compared with 3,574,000 tons in 1943.

Automotive and aircraft industry received 3 per cent of total shipments last year, 2,039,000 tons against 2,519,000 tons in 1943. About 4,454,000 tons were utilized by the construction industry in 1944, compared with 4,485,000 tons the year before.

Oil, natural gas and mining industries received 1,479,000 tons in 1944, against 1,380,000 tons in 1943. Machinery and tool makers got 2,486,000 tons last year and 2,531,000 tons in 1943.

Over 2,921,000 tons went in 1944 to the pressing, forming and stamping industry as against 2,484,000 tons in 1943, while the steel converting and processing industries received 5,589,000 tons last year compared with 5,170,000 tons in 1943.

War Output Loss In Flooded Ohio Valley Slight

Some plants forced to close temporarily at Pittsburgh, Steubenville, Portsmouth and Cincinnati

FLOOD conditions in the Ohio river valley last week caused less damage to steel mill operations and war production than had been anticipated earlier. At week's end the crest was believed to have passed and, barring further heavy rains, serious damage to war plants was believed to have been averted.

Numerous steel and other metalworking plants, however, were forced to suspend operations and some damage to equipment resulted.

In the Pittsburgh district, Jones & Laughlin Steel Corp. shut down six open hearths and two blast furnaces; total loss in production was estimated at 800 tons of iron and 1200 tons of steel. Some units of Carnegie-Illinois Steel Corp. also suspended, but tonnage loss was reported to be slight. Allegheny Ludlum Steel Corp. was down for one turn.

Gravest threat in the Pittsburgh district was to coal shipments. River movements were seriously handicapped by water, and an unusually heavy burden was thrown upon the railroads. Some mines were flooded.

LSTs Saved from Flood

American Bridge Co. suspended shipbuilding operations at Ambridge, Pa., temporarily and Dravo Corp. suspended at Neville Island. Dravo Corp. was compelled to launch two LSTs at midnight to keep them from being carried down the Ohio, much to the discomfiture of the women sponsors.

Wheeling Steel Corp., at Steubenville and Portsmouth, O., was hard hit by the flood and the Wheeling district operating rate dropped 30½ points to 68 per cent of capacity. Benwood, W. Va., blast furnace and bessemers also were down.

Weirton Steel Co. at Weirton, W. Va., and Steubenville, O., reported little damage.

Cincinnati district operations declined 15 points to 72 per cent of capacity. The huge Wright Aeronautical Corp. plant building B-29 engines was closed for a day as flood waters closed roads leading to the plant.

Many other plants in the Ohio valley suffered a loss of production as the high waters disrupted transportation and kept workers from their jobs. In some areas, workers were called out for flood relief work, contributing to higher absenteeism.

BIENNIAL ANTAGONISTS: Locked in the traditional odd-year dispute over the contract between soft coal miners and mine operators are John L. Lewis, right, head of the miners' union, and Charles O'Neill, spokesman for the operators. Chief of the miners' demands is that for a royalty of 10 cents a ton to the union for "medical and surgical service, hospitalization, insurance, rehabilitation and economic protection". Other demands, including a basic 35-hour week, shift differentials, liberalized vacation pay, are estimated by the operators as amounting to $400 million a year, or $3.30 a day increase for the miners. NEA photo

Production Adjustment Program Developed to Offset Cutbacks

WAR Production Board last week announced a new production adjustment program developed by its Production Readjustment Committee and approved by Justice James F. Byrnes, director of War Mobilization and Reconversion. The plan applies to both current production adjustments and to those which are expected after the defeat of Germany. It provides administrative machinery necessary to the detailed execution of section four of Justice Byrnes' directive of Jan. 20, 1945, requiring WPB Chairman Krug to formulate the plan.

Under the new adjustment program the procurement services are required to notify manufacturing plants of work termination at least seven days in advance of cut-off date when the cutback involves more than $100,000 a month in any one month of the following year.

Procurement agencies are still required to give as much advance notice of a termination as is feasible but in no case may the advance period be less than one week if the adjustment involves more than the $100,000 limit, except in agreed upon emergency cases. Exceptions to this procedure will be made only with the consent of the chairman of the production readjustment committee.

Simultaneously with notification of the contractor, WPB will notify national labor unions concerned with the adjustment.

The program emphasizes the need for channeling war production to facilities which are released by cutbacks. In each region production urgency committees will assume the responsibility for assuring most effective use of released facilities.

Under the production adjustment program efforts will be made to channel new war work to release plant facilities prior to the actual cut off of production of terminated or cut-back contracts.

Open capacity information is available for those wishing to place contracts through procurement officers in WPB local offices and Smaller War Plants Corp. regional and district offices. Plans to bring about most effective use of facilities apply to those facilities which are released as a result of contract runouts, as well as from terminations or adjustments.

Is New Steel Merger in Making? Trade Speculates on Possibility

Colorado Fuel & Iron Co. indicates interest in acquiring government-owned Geneva, Utah, plant after the war. Crystal gazers link Wickwire Spencer, Rotary Electric, Crucible, Phoenix, Andrews with Colorado in speculations

OUTLINES of a large, new integrated steel producing corporation, with principal activity in the alloy field, are seen by some industry observers, with the possible assistance of stock brokers and investment bankers who are often anxious to stimulate such crystal-gazing. While there is nothing official about the picture, it has been constructed in about the following way:

Allen & Co., New York investment banking firm operated by Charles and Herbert Allen, working in co-operation with Floyd Odlum's Atlas Corp. and the Schoellkopf interests in Buffalo (breweries, finance, Bell Aircraft, etc.), some months ago acquired control of the Colorado Fuel & Iron Corp., purchasing securities owned by the Rockefellers. About the same time, the group acquired major interest in Wickwire Spencer Steel Co., Buffalo, and at present Charles Allen is chairman of the board of both companies.

Colorado Fuel & Iron officials last week expressed interest in acquiring or leasing the government-owned Geneva Steel Co. plant at Geneva, Utah.

Meanwhile, it has long been known that the Atlas Corp. has owned a sizable interest in the Rotary Electric Steel Co., Detroit, whose well-liked and efficient president, W. H. Colvin Jr., recently resigned to assume the presidency of Crucible Steel Co. of America. He made the change after months of negotiations during which time he is reported to have attempted to effect a merger of the two companies, but was unsuccessful.

Atlas Corp. also is reported to have a substantial interest in the Phoenix Iron Co., Phoenixville, Pa.

Reports also are heard that the same financial interests may be negotiating for the control of Andrews Steel Co., Newport, Ky.

Reviewing the facilities of these six companies, the following tabulation may be made, listed alphabetically:

ANDREWS — Seven open hearths; blooming mill and 24-inch bar mill. Specialties are forging billets and slabs, alloy billets, rerolling billets, die block billets, sheet bar. Capacity 441,000 gross tons annually.

COLORADO FUEL & IRON—Blast furnaces, coke ovens, ore mines, rail and structural mills, wire mills, equipment for producing specialties like mesh, wire products, spikes, bolts, rivets, etc. Capacity 712,500 gross tons pig iron, 1,007,016 tons basic open-hearth steel, 3000 tons steel castings.

CRUCIBLE STEEL — Plants at Jersey City and Harrison, N. J.; three at Syracuse, N. Y. (Halcomb, Sanderson and Emerson Works); McKees Rocks, Midland and Pittsburgh, Pa. (Spring Works, Midland Works, LaBelle Works, Park Works.) Products include tool steels, stainless and other alloy steels, drill rod, fine wire and strip specialties, coil and elliptic springs, semifinished and tin plate, carbon and alloy bars and billets. Midland Works of the Pittsburgh Crucible Division operates blast furnaces, coke ovens and open hearths as well as electric furnaces; other plants melt principally in electric furnaces, but Pittsburgh Crucible's Park Works also has four open hearths.

PHOENIX IRON—Products are principally structural shapes, with plant having six open hearths, blooming mill and two structural mills. Capacity is 195,000 tons annually.

ROTARY ELECTRIC—Operates two 50-ton electric melting furnaces, blooming and bar mills, as well as cold drawing, annealing and heat treating equipment, important supplier of highgrade aircraft and automotive alloy steel, as well as SAE 52100 bearing steel. Capacity is 165,000 net tons a year.

WICKWIRE SPENCER — Chief products are wire and wire specialties. Blast furnaces, open hearths, rolling mills, wire mills and fabricating mills are operated. Capacity is 350,000 gross tons of pig iron, 125,000 gross tons of wire rods and 120,000 net tons of wire and wire products annually. Plants are located at Buffalo, and Palmer, Worcester and Clinton, Mass. A Blue Island, Ill., plant of Wickwire Spencer Aviation Corp. is inactive.

Such a combination would provide a well integrated and diversified group of facilities, strategically located geographically, for production of all types of steel and a variety of products ranging from fine wire to heavy structurals, and from railroad specialties to high-quality alloy and tool steels. Total indicated steel capacity is around 3,500,000 tons annually.

POSTWAR PREVIEWS

REHABILITATING VETERANS— Industry co-operates with government in program that permits wounded servicemen to learn and earn while they heal at Crile General hospital, Cleveland. Plan increases production of war material, builds goodwill for industry. See page 73.

WALLACE AND POSTWAR PLANS— Although the commerce cabinet post has been stripped of its important lending powers, New Dealer Henry Wallace will exercise vast influence and authority in formulating postwar programs. See page 76.

CONSTRUCTION— Huge pent-up demand for building expected to be major factor in postwar employment picture. See page 78.

NEW STEEL DYNASTY?— Crystal gazers see possibilities of important new steel-producing combine involving established and war-born facilities. See page 81.

LIGHT METALS— Current hearings before Senate Small Business Committee on light metals plants may influence pattern for disposition of government-owned facilities. See page 82.

MEGACYCLE INDUCTION HEATING— Extremely high frequencies of 2 to 5 million cycles per second used in rapidly producing hardened cases on steel parts of from 0.003 to 0.030-inch depth soon may be used to heat treat sorbitic steels, duplicating results of sub-zero treatments. See page 116.

AUTOMATIC DIPPING— Giant installation at Willow Run—combining conveyor, baskets and dipping tanks in single unit—produces oxidized finish on aluminum parts with negligible handling. Savings in floor space, labor and customary miscellaneous equipment suggest peacetime application where volume warrants its use. See page 118.

Disposition of Government-Owned Light Metal Plants Weighed

Hearings before Small Business Committee may set pattern for future of other government-financed facilities. Emphasis placed on full utilization of productive capacity after the war. Data covers much territory

"LIGHT METAL" hearings now being conducted by the Senate Special Committee on Small Business will help shape the congressional policies and establish guides for industry in the disposition of the government's vast investment in aluminum and magnesium plants. The hearings form a part of the comprehensive program aimed at bringing to a conclusion the economic studies of the former Temporary National Economic Committee headed by Sen. Joseph C. O'Mahoney (Dem., Wyo.).

Although data being collected in these hearings cover much territory, the primary issue is whether the light metal facilities shall be controlled by big business or small business.

The hearings were carefully planned by three well-known government economists, Dr. Dewey Anderson, formerly executive secretary of the Temporary National Economic Committee, Dr. Meyer Jacobstein, economist of the Brookings Institution and executive director of the Senate Special Committee on Postwar Economic Policy and Planning, and Bertram Gross, head of the staff of Senator O'Mahoney's War Contracts Subcommittee.

These men eventually will prepare a report which will go far in determining what legislation Congress will enact to cover disposition of government-owned aluminum and magnesium plants. From developments to date, it appears probable their report will recommend: 1. That aluminum and magnesium plants be so disposed of as to insure plenty of competition in the sale of these metals after the war; 2. that the government be prepared to extend any financial or other assistance necessary to accomplish this objective, as well as to encourage large consumption of the light metals.

Before the start of the light metal hearings, the chairmen of the various Senate committees and subcommittees concerned with the problem of disposing of government-owned facilities held conferences. Represented were the Industrial Reorganization Subcommittee of the Special Committee on Postwar Economic Policy and Planning, the War Contracts Subcommittee of the Committee on Military Affairs, the whole Special Committee on Postwar Economic Policy and Planning, the Special Committee on Small Business, the whole Committee on Military Affairs, the Technological Mobilization Subcommittee of the Committee on Military Affairs, the Committee on Patents, and the War Investigating Committee. Certain administration agency heads, including Chairman Guy Gillette of the Surplus Property Board, and Attorney General Francis Biddle, also were called into consultation.

In these conferences, disposition of individual plants representing a government investment of more than $5,000,000 was considered. These include aluminum, magnesium, aircraft, synthetic rubber, chemical, steel and aviation gasoline plants and pipelines. When the Surplus Property act was enacted last year, congressmen believed specific legislation in regard to the disposal of these large plants would be required. Hence, the purpose in mind in the recent conferences was to fill this omission.

Sees Need of Congressional Action

"What use is to be made of these facilities, which constitute a very substantial share of the existing plant capacity and equipment in these most important industries, and which are owned by the federal government, will go far in determining the nature and shape of our national economy in the postwar world," explained Senator O'Mahoney in commenting on these conferences. He cited the recent announcements of the United States Steel Corp. and Henry Kaiser registering interest in acquiring the government-owned steel plant at Geneva, Utah, as indications that industrial thinking about such matters has progressed to a stage which necessitates action by Congress.

The approach on the problem being made by the Senate Small Business Committee, said Senator O'Mahoney, will be the pattern for the other Senate committees and subcommittees concerned

SEN. JAMES F. MURRAY

SEN. JOSEPH O'MAHONEY

with the problem, inasmuch as the angles requiring consideration are pretty much the same for the various classes of property. One vital question is whether the capacity of these plants can be utilized in time of peace.

"The productive capacity of these plants is far beyond the consumptive capacity of any market heretofore known, except a war market," said Senator O'Mahoney. "Whether the plants will be utilized or locked up may depend on whether or not the studies now in the course of preparation will develop a practicable means for using this tremendous industrial capacity for purposes of peace.

"If we can find a way to use in peace the tremendous quantities of aluminum, steel, aviation gasoline, synthetic rubber and other commodities which the war has shown we can produce, the problem of carrying the national debt will be well on the way to solution. It long has been recognized that mass production alone will not maintain our economy, but that mass consumption is also needed.

"The problem before these committees will be how to maintain the national income so that the purchasing power of the people to buy the goods and services that agriculture and industry produce may be maintained. If purchasing power is maintained, national income will be maintained and, as a consequence, government revenues can be raised to meet the debt."

Immediate Study Urged

The study must be undertaken without delay, concluded Senator O'Mahoney, because the Surplus Property Board soon will make its first report, with recommendations, to Congress. "Otherwise," he said, "any report prepared by the Surplus Property Board in compliance with the law would be in danger of finding Congress and the country unprepared for the tremendous decisions which must be made."

Groundwork for the light metals investigation was laid when Hans A. Klagsbrunn, executive vice president, Defense Plant Corp., and deputy surplus property director, Reconstruction Finance Corp., told the Small Business Committee that the wartime expansion multiplied prewar aluminum capacity by seven and prewar magnesium capacity by 80. In 1939 aluminum production was 327,085,000 pounds and magnesium 6,700,000 pounds—alltime peaks.

Current rated capacity, following expansion by private interests and the government, is estimated at 2,286,000,000 pounds for aluminum and 586,000,000 for magnesium; actual attained production indicates an even larger capacity for both metals but actual capacity figures are not known because of cutbacks that resulted when supplies of these metals became adequate.

Investment in government plants, said Mr. Klagsbrunn, amounts to $67,658,000 for aluminum and $389,299,000 for magnesium facilities; in addition, $58,000,000 was loaned, $35,000,000 to Reynolds Metals Co. for alumina and aluminum plants at Lister Hill and Sheffield, Ala., and aluminum at Longview, Wash., $22,000,000 to Permanente Metals Corp. for magnesium, and $1,000,000 for miscellaneous facilities. His report set forth full details about cost of operating government-owned plants, disposition of the product and other information.

MEYER JACOBSTEIN

(Mr. Klagsbrunn will supplement this testimony when he appears before the committee later. At that time, for the benefit of those readers whose postwar plans will be influenced by the overall light metals situation, STEEL will publish pertinent data presented by him.—The Editors).

Among early witnesses was Arnold Troy, president and general manager, Eastern Metal Products Co., Tuckahoe, N. Y. Mr. Troy made it clear that he spoke as one of many thousands of metal fabricators. Mr. Troy's recommendations made a favorable impression on the committee. He made two basic demands:

1. That it would be harmful to business in general to sell the government-owned aluminum and magnesium plants to a few big producers. Rather, they should be disposed of in such a way that there will be at least half-a-dozen sources of supply of each of these metals after the war—and all in a position to compete with big producers. When there are one, or only a few producers, he said, they "can control the destinies of thousands of small fabricating plants without having a cent of financial investment in them." To insure adequate postwar competition, said Mr. Troy, it will be necessary to sell the government-owned facilities to new companies not yet in the field.

2. That the aluminum and magnesium producers should be prohibited from fabricating products out of the light metals. At the present time it is customary for these producers to compete with their customers in the manufacture and sale of fabricated products; this, he said, is all wrong. It is very essential, he went on, that the big producers develop information for the benefit of their customers. At the present time they are performing very satisfactorily in handling techniques along to the small fabricators; for example, the magnesium producers have enabled small fabricators to overcome the fire hazard when working with magnesium. However, they should develop this information in research laboratories and not as a feature of their competition with the metal fabricators. "They should be organized," he said, "along the lines of the New Jersey Zinc Co. which conducts vast research work and hands the resulting information on to its customers, and without competing with them in the sale of fabricated zinc products."

Based on experience in his own organization, said Mr. Troy, use of light metals is growing fast; the largest potential consumers of these metals, such as the transportation industry, the electrical industry, the automotive industry and others, have been switching to the light metals for many parts. Stimulating this trend is a rapidly increasing ability on the part of the fabricators to design and produce new and difficult parts in the light metals. He thought that much of the growth in the use of light metals will be at the expense of steel and other metals, and other materials; he sees that trend in operation continuously in his own shop.

Predicts Light Metals Age

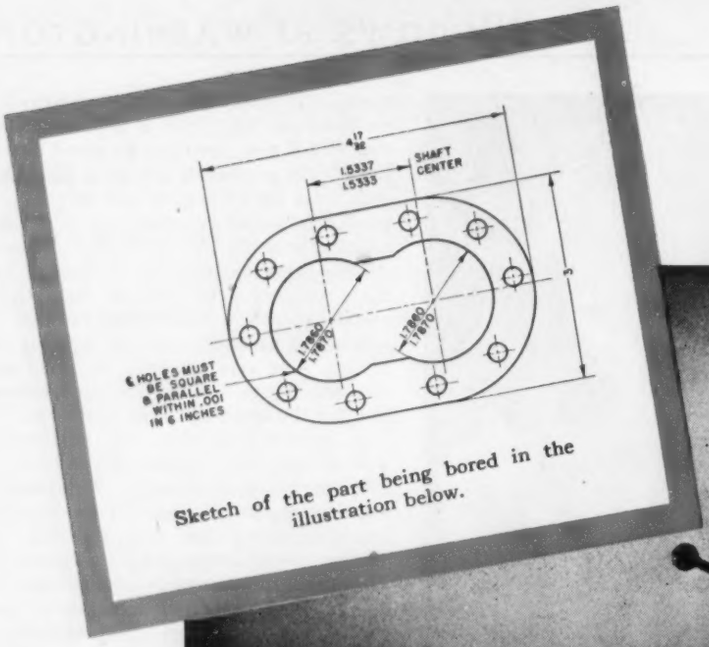
"Just as we had a stone age and an iron age and a steel age," said Mr. Troy, "we are going to have a light metals age. Aluminum production will be a business barometer in the future as pig iron and steel ingot production rates are now."

Amendment to the Price Stabilization act to provide floor as well as the present ceiling prices was one of Mr. Troy's recommendations.

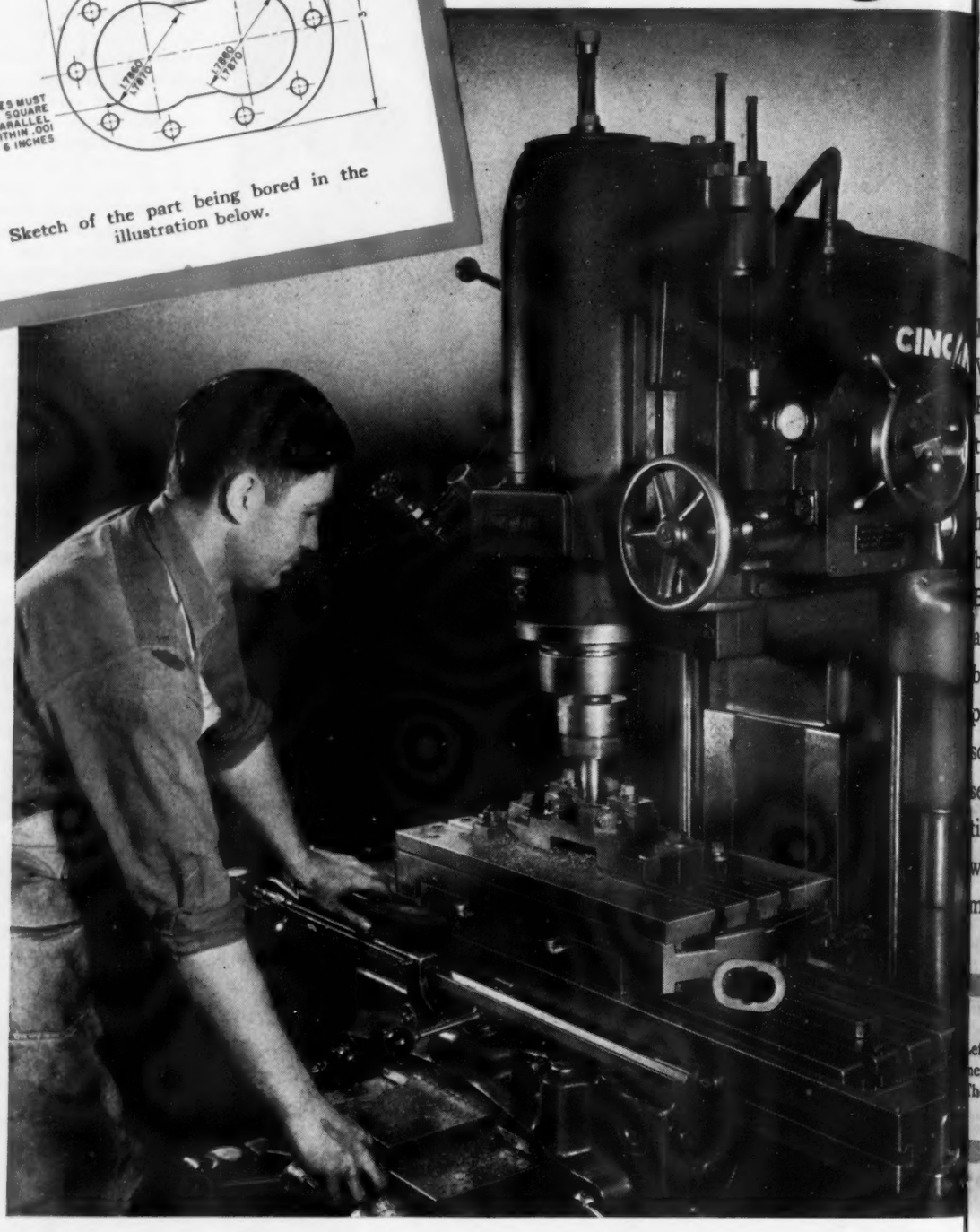
"We hear talk of a reduction in the aluminum price from 15 to 13 cents after the war to encourage use of metal," he said. "Such a reduction should by no means be made through the use of a subsidy. If there is to be such a reduction it should not occur until at least a year after the war has ended; putting it into immediate effect would cause a big loss in inventory values at a time when the cash position of many companies would be under severe strain due to needs of the reconversion period.

"There should be a floor under prices for six months to a year after the war ends to give industry a chance to get into

High P



Sketch of the part being bored in the illustration below.



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Keep on buying WAR BONDS

THE CINCINNATI MI

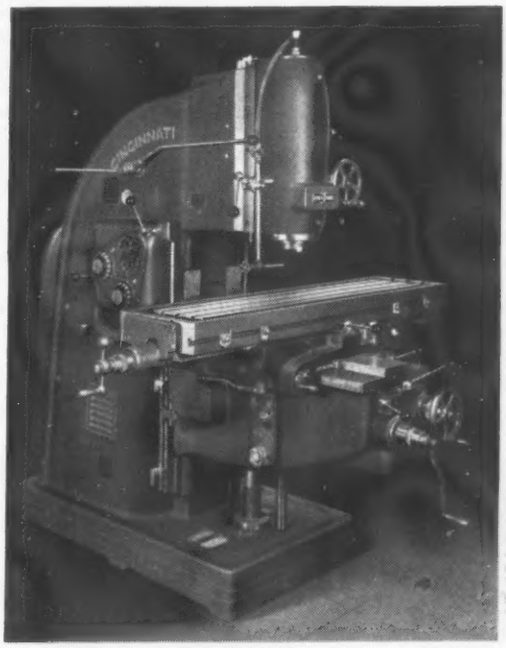
MILLING MACHINES

Production Attachment

Goes to Bat for Precision!

CINCINNATI

In the illustration on the opposite page, a CINCINNATI Vertical Dial Type Milling Machine, equipped with Power Feed to the Head, is rough and finish boring two $1\frac{25}{32}$" holes in a pump part, using a standard Index Base to obtain the desired precision. The work holding fixture is located so that the two holes to be bored are concentric with the center of the Index Base swivel. When the first hole is bored, the operator simply swivels and clamps the Index Base and bores the second hole. On this job accuracy was of paramount importance because the bore had to be square and parallel within .001" in 6". ¶ The above setup is rather unusual, but it emphasizes the versatility of the Dial Types. Perhaps it suggests ways in which the Dial Types and standard milling attachments could solve many of your machining problems.



CINCINNATI *No. 3 Vertical Dial Type Milling Machine. Dial Types are available in Plain, Universal and Vertical styles, Nos. 2, 3 and 4 sizes, Medium and High Speed Ranges. Catalog M-970-2 contains complete information and specifications. Sweet's Catalog File for Mechanical Industries contains a brief description of these machines.*

eft: Rough and finish boring two holes in a pump part. Equipent includes 12" x 24" Index Base and Power Feed to the Head. he machine is a CINCINNATI No. 2 Vertical Dial Type Miller.

MILLING MACHINE CO. CINCINNATI 9, OHIO, U. S. A.

BROACHING MACHINES • CUTTER SHARPENING MACHINES

civilian production without taking inventory losses."

In response to questions from the committee, Mr. Troy favored government financial assistance to those companies needing it for reconversion, and particularly for the help of companies in the light metals field. But he urged a policy of careful discrimination in making loans and disposing of plants. People of proven responsibility, who have the "know-how" of business, should be helped. Any other policy, he said, would hurt established business and would result in confusion to the general economy.

Cites Two Handicaps

R. S. Reynolds, president, Reynolds Metals Co., complained forcefully to the committee that he is under a handicap in producing aluminum for two reasons. The first, he said, was failure on the part of the Reconstruction Finance Corp. to give him the same favorable financial treatment it gave to competitors. The second was failure of the Tennessee Valley Authority to give him as low a power rate as was given to competitors.

"We were required to pay 3.14 mills per kilowatt hour to TVA as contrasted with TVA's rate of 2.74 mills to the Aluminum Co. of America. TVA now is considering offering Reynolds a new contract and has suggested a formula under which power may be available at a lower cost per kilowatt. The whole future of the investment at Lister Hill, Ala., depends on obtaining a fair power rate, and obtaining a contract under which we will pay only for such power as we use.

"Our engineers," continued Mr. Reynolds, "advise that aluminum can be successfully produced with two-thirds secondary power and one-third primary power. Government power should be available for aluminum production at not over 1 mill per kilowatt hour, which would figure 2 mills for the primary power and ½ mill for the secondary power, which would otherwise go over the dam."

Whereas Reynolds owns its aluminum producing facilities, built under government loans, it is operating a sheet, bar and rod mill at Lister Hill in which the Defense Plant Corp. invested $21,276,943. Up to Dec. 31, 1944, Reynolds paid rent to the DPC in the amount of $6,500,000. In addition, Reynolds borrowed $3,000,000 working capital from the RFC to operate this plant.

Mr. Reynolds, asked whether he proposed to exercise his option to buy Lister Hill mill, said emphatically he would not close on the option as it now stands. He revealed his bargaining position very frankly as follows:

"We have an option to acquire the interest of the DPC in the Lister Hill mill at a fair price equal to the cost less depreciation or rent paid, whichever produces the highest price for the government. We are interested in acquiring the property, provided our power situation at Lister Hill can be worked out satisfactorily, and provided we know that we are acquiring it on terms as favorable as those granted to others in the disposal of other fabricating facilities. We must have equal treatment, because the amortization expense represented by the cost of acquiring the mill is a very important item in the cost of fabricating aluminum.

"It is generally recognized, even by government agencies," he went on, "that plants of this character cost at least 35 per cent more to build during the war than they would have cost in peacetime, and that they are not as efficient as plants built expressly to fill peacetime needs. That excess cost is a pure war cost which the government cannot hope to recoup from any prospective purchaser.

"If that 35 per cent is deducted from the cost, Reynolds Alloys Corp. (subsidiary of Reynolds Metals Co.) is prepared to pay the balance of the cost, less the $6,500,000 we have already paid in rent, provided payment can be made over a 20-year period with interest at 3 per cent, the payments of principal being made in 15 equal payments commencing in 1950.

"Our willingness to do this would have to be conditioned upon an express right to receive the benefit of any more favorable terms granted to others who may acquire aluminum fabrication facilities from the government under more favorable terms."

Aid to Canadian Producers Attacked

Unusual interest was aroused among committee members when Mr. Reynolds complained of the favorable terms under which the United States government has built up the Aluminum Co. of Canada "to a dominant position in the foreign market at the same time it is entirely outside the jurisdiction of the American antitrust and taxing authorities and is free to enter into cartels with German and other companies, as it did prior to the war." The Canadian producer, because of its large capacity and low overhead, he said, may be able to ship aluminum products to the United States in competition with domestic producers despite the tariff barrier of 3 cents a pound. In the light of terms accorded the Canadian producer, said Mr. Reynolds, he thought the government should reduce interest on his loans from 4 to 3 per cent and extend the time of payment by 10 years.

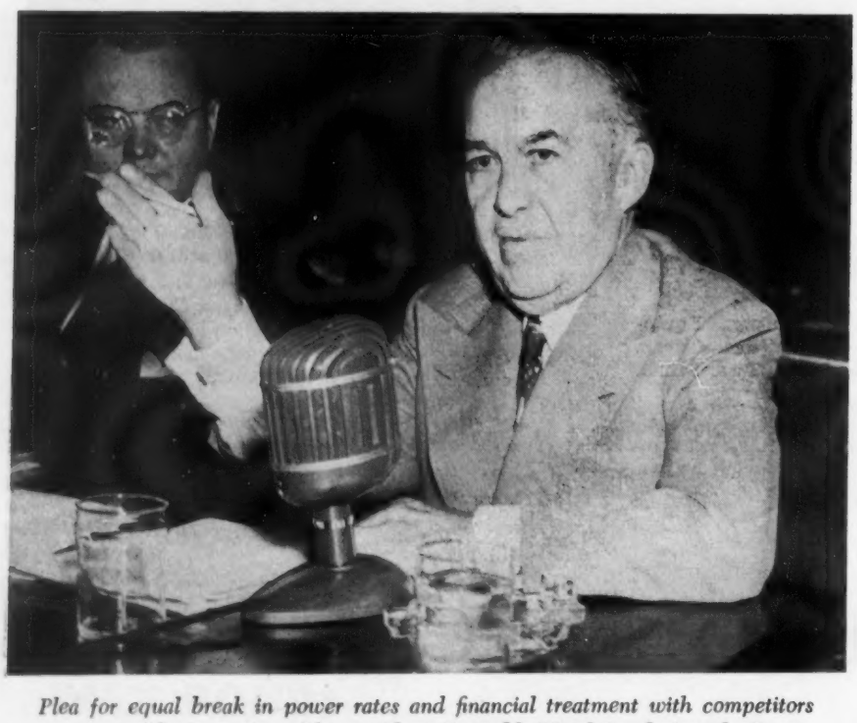
Mr. Reynolds predicted vigorous competition will result after the war in development of new streamlined production processes. "The only process for making aluminum developed to date," he said "is intricate, slow and expensive and requires vast amounts of capital and equipment per ton of aluminum."

Mr. Reynolds was extremely optimistic in predicting the future of the aluminum industry.

"The day may not be far distant," he said, "when the United States will require several times as much aluminum a year as our peak war production. After all that was only 15 pounds per person and less than 2 per cent of our steel production."

New metallurgical progress will help greatly, he said; "the best strong aluminum alloys had not been developed when war broke out."

Aluminum cannot be produced with



Plea for equal break in power rates and financial treatment with competitors was voiced by R. S. Reynolds, president, Reynolds Metal Co., before the Senate Small Business Committee. Mr. Reynolds predicted widely expanded uses for aluminum after the war. NEA photo

out bauxite, he said, and the United States should seal its present limited reserves of this raw material for future emergencies. Enough bauxite, he said, can be brought in from abroad; Reynolds Metals Co. has obtained access to an ample supply of bauxite in Haiti and Jamaica.

He again alluded to the power angle, saying that 10 kilowatts of electricity are required to produce each pound of aluminum, "so that power becomes the greatest single production cost." The whole subject of power costs, in the light of the importance of such costs to the economy of the future, he declared, calls for an enlightened public policy.

In the debate as to whether a primary producer of aluminum or magnesium should or should not sell fabricated products in competition with his customers, Mr. Reynolds took the position that the majority of small companies are unable to invest in the equipment required for a host of fabricating operations such as shearing, blanking, routing, drilling and forming. Reynolds' Aircraft Parts Department at Louisville, Ky., he explained, has effected great economies in the aircraft procurement program and increased production efficiency by supplying parts which could be fed into aircraft producers' assembly lines without further fabrication. This large fabricating plant, in addition to reducing investment in capital facilities at consuming plants, saves hauling of excess metal which would have to be returned to the manufacturer as scrap.

Estimates Postwar Use

The testimony of Mr. Reynolds was featured by estimates of huge postwar consumption of aluminum and aluminum alloys by the railroad, automobile, building construction and other industries. New Reynolds-engineered products that have a big future, he predicted, include sheets of wood glued between two sheets of aluminum, aluminum-coated steel sheets, aluminum foil for packaging food, aluminum cord for conducting heat out of tires, and even aluminum thread for manufacture of dresses, handbags, vanity cases, costume accessories. He exhibited many of these items, including a tablecloth made for the present Duke of Windsor. "The end uses of aluminum," he said, "are too numerous to mention, and the design, manufacture and sale of aluminum products present countless opportunities for thousands of small businesses."

Dr. W. Y. Elliott, vice chairman, War Production Board, in charge of civilian requirements, warned the committee against encouraging the entry of a large number of interests into the business of manufacturing aluminum and magnesium. He thought the light metals producing industry will be on the healthiest basis in the postwar period on a "basis of competition between a rather limited number of units;" competition, he suggested, might well be among "less than a dozen

(*Please turn to Page* 206)

PRIORITIES–ALLOCATIONS–PRICES

Weekly summaries of orders and regulations, together with official interpretations and directives issued by War Production Board and Office of Price Administration

INSTRUCTIONS

COAL SUPPLIES: A priority list designed to channel coal to essential war and civilian users during short periods of emergency announced by the War Production Board. Certain types of war plants, railroads, utilities and hospitals stand high on the list. WPB stated there will be no priorities within any class, and that the number of classes which can be protected will vary with the seriousness of the local or national shortage. Concurrent with the WPB action, the Solid Fuels Administration outlined a plan for implementing the priorities for coal deliveries. Under this plan the agency will issue an order defining the time and place and the extent of the application of the priorities list. In such instances this order will supersede or amend all existing SFAW orders, and will specify the method by which consumers of coal will report their priority status to their suppliers.

DE-WATERING PUMPS: During the period March 3 through May 15, 1945, dealers' stocks of new de-watering pumps in 12 states where flood conditions are expected may be sold only on War Production Board authorization, except those needed to fill orders from a war agency or those rated AAA. Lease of such pumps is permitted only on WPB authorization. This action, taken by an amendment to Direction 2 of order L-192 is designed to make certain pumps will be available where needed to combat flood conditions. Dealers in New Hampshire, Vermont, Massachusetts, Connecticut, New York, Pennsylvania, West Virginia, Ohio, Indiana, Illinois, Kentucky and Missouri are affected.

L-Orders

SWIVEL IRONS: Manufacturers may substitute metal swivel irons for wooden ones in making office chairs only to the extent that they do not thereby increase their dollar value of furniture production in any quarter over that in the fourth quarter of 1944. (Interpretation 2 to L-260-a).

BUILDING MATERIALS: Amendment to L-228, Asphalt and Tarred Roofing Products and Asphalt Shingles, discontinues permitted manufacture of type 4 of the first table in schedule A; changes specification of types 5 and 6 in the eleventh table; deletes twelfth table. (L-288 amended).

M-Orders

MICA SPLITTINGS: Order M-101-A amended by Miscellaneous Minerals Division deletes necessity of filing WPB-3297. (M-101-A).

CHEMICALS: Order M-371 governing trichlorethylene and perchlorethylene revoked and controls transferred to Order M-300, the general chemicals allocation order. Small order exemption for both chemicals reduced from one drum to less than one drum. Suppliers now required to list by name all customers ordering more than 7000 pounds of perchlorethylene per month. Formerly customers were permitted to order up to 10,000 pounds per month before listings were required. Similarly, quantity of trichlorethylene permitted without individual listings reduced from 10,000 to 3250 pounds per customer. (M-300).

ROSINS: Because inventories of gum and wood rosin are dangerously low the War Production Board has issued Order M-387 establishing quotas of rosin that may be used in the production of all but "preferred orders." (M-387).

PRICE REGULATIONS

TIN: Price to be paid for Bolivian tin during remainder of basic tin agreement between Bolivia and United States will be increased from 60 cents to 63½ cents. An amendment to basic contract, in force since 1940, has been signed. The new price is to be effective from Dec. 19, 1944 to June 30, 1945 when the basic agreement expires. Provision is made for new schedule of smelter charges to encourage production of higher grade ores and concentrates. Amendment also provides for retroactive increase of 2 cents per pound from July 1, 1944 to Dec. 19, 1944.

BITUMINOUS COAL: Amendment 1 to order 68, Maximum Import Price Regulation, has been amended to eliminate inadvertent price increases which had taken place in Canada before April 30, 1943, and in setting up the criteria to be followed, provides that the regional administrator may take as the pricing basis the prices charged by Canadian exporters in April 1943 and permit a further roll forward to reflect subsequent increases allowed by Canadian authorities. (Amendment 1 to order 68, Maximum Import Price Regulation).

REFRACTORY PRODUCTS: Amendment 73 to order A-1, MPR 188, permits resellers of refractory products in certain areas to sell at manufacturers' maximum prices when specified conditions are met. The amendment also permits dealers making sales to customers on which shipment is made direct from the manufacturer's plant, to increase their resale prices up to the manufacturer's increased maximum prices when the dealer and the manufacturer customarily sold or if they did not sell they would have sold to the same class of purchaser in the same marketing area at the same price. (MPR 188, amendment 73 to Order A-1).

TEXTILE BOBBINS: Manufacturers may sell textile bobbins and spools made principally of wood on an adjustable pricing basis using ceiling prices under MPR 136 with the right to charge whatever price increase is granted in subsequent rulings. (MPR 136).

Appointments-Resignations

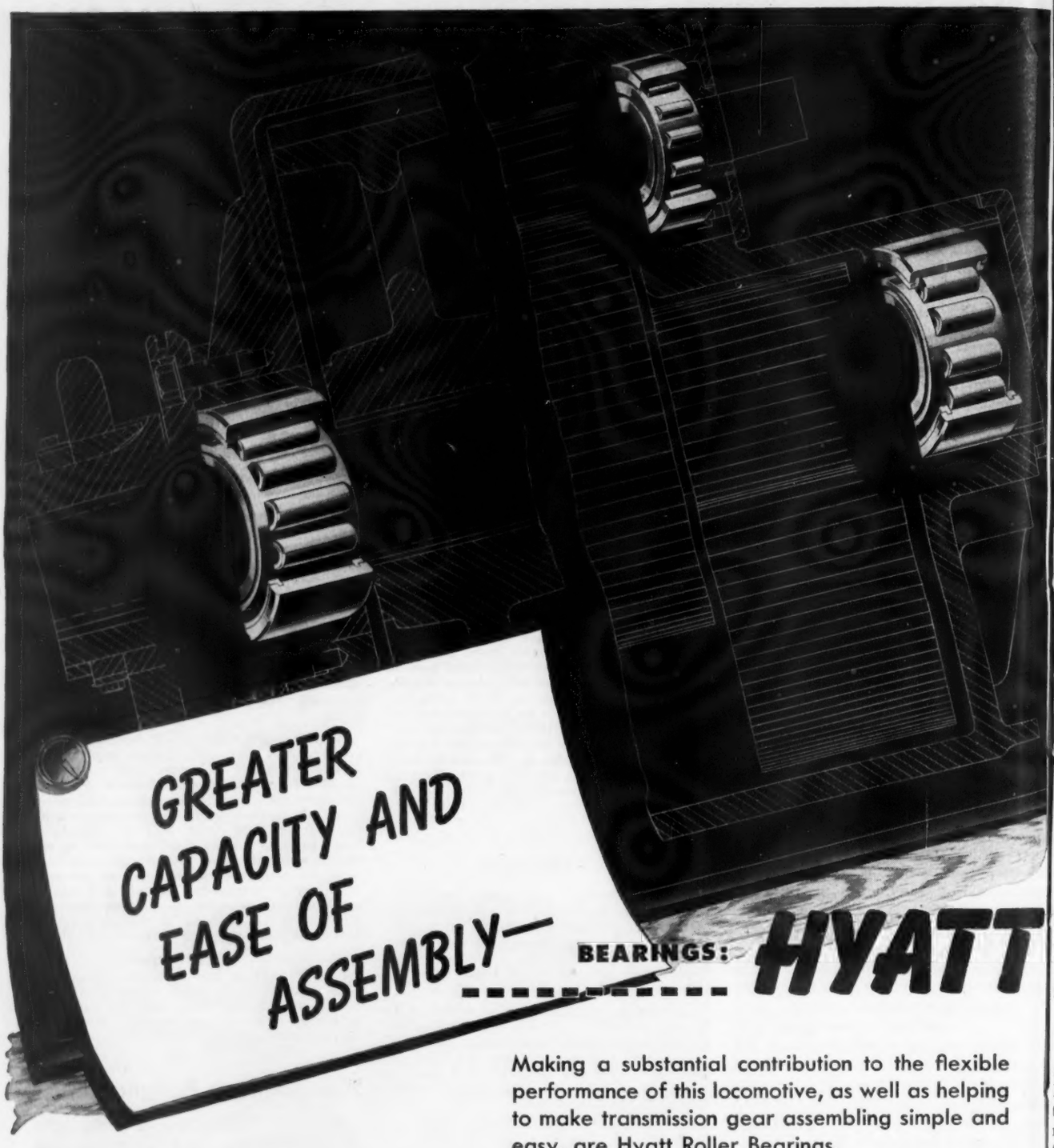
Philip D. Wilson, New York city, vice chairman of the Office of Metals and Minerals of the War Production Board, has been named special assistant to WPB Chairman J. A. Krug to survey critical and strategic metal situations, the agency announced. He will be succeeded as vice chairman by William C. Keeley, who joined the WPB staff recently as production consultant to Mr. Krug.

* * *

Col. Frederick C. Horner has been appointed consultant on highway transportation, Stockpiling and Transportation Division, War Production Board.

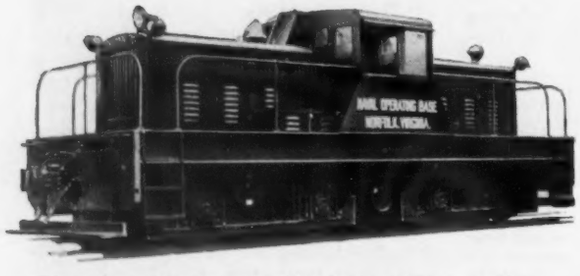
* * *

Col. Maurice Hirsch has been appointed as the War Department representative on the War Contracts Price Adjustment Board and has been elected chairman of that board.



GREATER CAPACITY AND EASE OF ASSEMBLY—

BEARINGS: HYATT



The Plymouth DE 1000 Diesel Electric Locomotive is an achievement in high powered, highly responsive industrial locomotive design. Built by Plymouth Locomotive Works Division of The Fate-Root-Heath Company, Plymouth, Ohio.

Making a substantial contribution to the flexible performance of this locomotive, as well as helping to make transmission gear assembling simple and easy, are Hyatt Roller Bearings.

The Hyatt Bearings in this application have the capacity and stamina to withstand the strains and jolts of frequent starts and stops. They also provide the distinct engineering advantage of inner race seats that remain as fixed parts of the shaft which are never disturbed by having to be removed.

If your plans for any type of rolling stock or production machinery call for improved performance or machine simplification, Hyatt engineers will be very glad to help you solve the bearing problems involved.

HYATT BEARINGS DIVISION · GENERAL MOTORS CORPORATION
HARRISON, NEW JERSEY

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Million man-hours lost in Dodge labor dispute; strikers return to work with cause of stoppage shrouded by charges and countercharges. Unionists lose in attempt to have Army take over plant

DETROIT

AFTER a ten-day vacation from allegedly vital war production, 13,500 employes were told to return to work at the Dodge main plant, after the several hundred ringleaders of the local union failed in their purpose to get the Army to take over the plant, so another 1,000,000 lost man-hours can be added to the strike record, with little accomplished beyond a slight clearing of the air around the Dodge plant.

Explanations behind the start of the walkout, summarized here last week, now prove to be somewhat in error, although they were based on information from the company. As the dispute drew out, the company released a revised statement which considerably altered the picture. Why these facts were not brought out in the first place remains a mystery which the Chrysler labor relations staff will have to unravel. At any rate, it now develops the seven employes operating gear-shaving machines processing a Wright engine fuel pump gear constituted the entire number at work on this job, four on the day shift, and three on the second shift. When the job started last September, production was found to be insufficient to meet demands, so new feed gears were installed on the gear shavers, after which production rose to 108 pieces per eight hours per machine. This was not enough, so the operators were asked to increase their output, which they did, to 120 pieces. Then a time study was made in presence of a union steward and production jumped again, this time to 135 pieces.

Dismissed for Insubordination

However, since the machines were designed to handle 225 pieces per eight hours, a better rate seemed logical and the operators were so instructed, one man being subsequently suspended for three days on Feb. 9, resulting in a three-day strike. When production resumed, output was raised to 152 pieces. This was still considered far short of reasonable performance so the operators were given eight days to show improvement. An increase to 156 pieces resulted, and at the end of the eight days the men were asked for a production count—that is, a report on how many pieces were produced that day. The men refused to supply the information and this was regarded as insubordination and grounds for their dismissal. The ten-day strike then followed.

So it now develops the discharges resulted, not from failure to meet a prescribed production rate but rather from refusal to give a production count. The reason for this sudden change in position by the company is simply that the union contract provides that rates of production will be established by the company "on the basis of fairness and equity." If objection is raised to the rates established, a time study shall be made with a union representative in attendance. This was done. Further disagreement calls for the dispute to go through the regular grievance machinery. This had been started but according to the union it should have allowed representatives of the international union to enter the plant to study the matter—permission the company is alleged to have refused.

Thus the whole picture is clouded by charges and countercharges, none of which is any too clear. The solution finally arrived at was for the men to return and for an impartial umpire to decide on a fair production rate for the gear-shavers, with the company agreeing to take no disciplinary action against the striking employes. Probably what persuaded them to return more than any other factor was the loss of ten days' wages, which probably would average pretty close to $125 per individual. This is no small loss. Unionists were expecting the Army to move in a couple days after the strike started, in order to get production moving, but the Army, despite the various official pleas urging a return to work, called their bluff.

Meanwhile a strike of more than 12,000 Briggs employes in seven plants here dragged into its second week, with no pattern for settlement in view. The walkout resulted from decision of the Briggs management to discharge 15 employes who were minor union local officers, because of their activities in fomenting a long series of labor disturbances over the past several years. The Briggs company's labor record has not been a happy one over the years. Probably no company in the automotive industry has been besieged by the continual rash of minor and major strikes such as have occurred at Briggs plants. This is somewhat strange, too, for their operations do not differ appreciably from a score of other plants in the district which, in comparison, have been free from strike troubles.

One unfortunate effect of the Briggs and Dodge strikes has been their contagion on other union groups at other plants. Brief flareups have occurred simultaneously at Ford plants, and at Gar Wood Industries plants, in the latter case workmen walking off the job after the company decided to operate five 10-hour shifts weekly instead of six 8-hour shifts.

Latest edition of *Automobile Facts and Figures* is just off the presses, and contains 64 pages of statistical data on the industry's achievements over the past year. Approximately $24 billion worth

Charges that the Chrysler Corp. was conspiring to undermine the United Automobile Workers-CIO were made to the War Labor Board during the recent strike at the Dodge main plant in Detroit. Shown at a hearing before the board are, left to right: Norman Mathews, national Chrysler director for the UAW; Richard T. Frankensteen, vice president of the union; Joseph M. Rubin, assistant to Mathews. NEA photo

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of war production have poured out of the industry's 1000 plants since the start of war production, cumulative war orders received since Sept. 1, 1939 exceeding $32 billion.

The publication's findings on the economic side of the industry reveal that despite lack of new passenger cars, 77 out of 100 motor vehicle dealers are still in business. Automobile body and parts plants during 1944 showed average employment of 694,000 men and women, over 27 per cent women. Wages reached a new high last year, averaging $57.36.

Among the nation's ten largest metalworking industries, the automotive industry ranked first, turning out 18.8 per cent of all war production in this category, exclusive of government-owned plants. Extent of subcontracting is shown by the fact 56 cents out of every $1 received goes to subcontractors and vendors. Located in 1375 cities, most are small businesses, 63 per cent employing less than 500.

Reporting on vehicle registrations, the publication reveals that the highest proportion of old cars on the road are owned by farmers and unskilled workers. Of 25,608,400 passenger car registration, 17.4 per cent are 12 years or more in age, with farmers owning 28 per cent of these and unskilled workers owning 31.9 per cent.

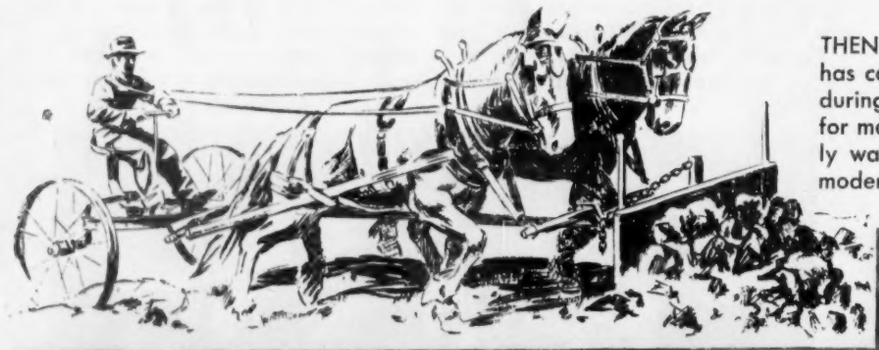
Spanking has been administered the Kelsey-Hayes Wheel Co. here for violating WPB regulations by accumulating excessive inventories of carbon steel. The Regional Compliance Commissioner of the WPB administered the punishment and placed the company on "probation" until May 2, charging the company with accepting deliveries of carbon steel during the first six months of 1944 which increased inventories beyond the 60-day limit permitted. The company also is alleged to have failed to adjust its applications, outstanding orders and scheduled deliveries, and did not postpone or cancel its orders in accordance with the controlled materials plan.

Assistant Secretary of War Robert P. Patterson was the first to divulge publicly the name of the new combat tank now in production at the Fisher and Chrysler arsenals here. It is the T-26 Model, a 45-ton unit equipped with 90-millimeter gun, 650-horsepower Ford-built engine, torsion bar suspension, wider treads giving improved flotation, and considerably heavier armor. Production of the new tank has been no secret around Detroit.

Earlier announcements from the Navy Department, indicating it would take over management of the Center Line Naval Ordnance Plant here from Westinghouse after July 1 now have been rescinded after a storm of protest from the UAW-CIO. Union spokesmen contended the morale of 5500 workers at the plant was faltering because of anxiety over their future status, since in January, the Navy circulated booklets among supervisory personnel describing wages and working conditions under civil service. The booklet aggravated fears wage cuts would ensue under Navy jurisdiction, as well as loss of collective bargaining powers. So, as might be expected, the Navy changed its mind, and the UAW immediately forwarded its congratulations.

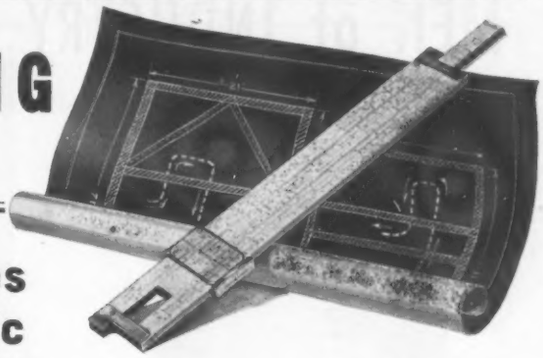
McLouth Steel Corp. here has announced that after careful study and investigation it has decided to enter the stainless steel field in the manufacture of both hot and cold-rolled strip and sheet. Although considerable equipment will be required eventually to expand in this field, the present rolling equipment, with moderate alterations and expense, is well adapted to the manufacture of this stainless product.

Reports are heard locally that the Ford contract for R-2300C Pratt & Whitney engines, recently announced as involving better than 100 million dollars, has now been canceled in favor of concentrating production of this model engine at Chevrolet plants in Tonawanda, N. Y. Also it is reported contract for production of Rolls-Royce Aircraft engines at the plant of Continental Aviation & Engineering Co., Muskegon, Mich., either has been or is about to be canceled by the AAF, after several hundred engines had been completed or started in process. This is the same engine being built by Packard Motor Car Co.

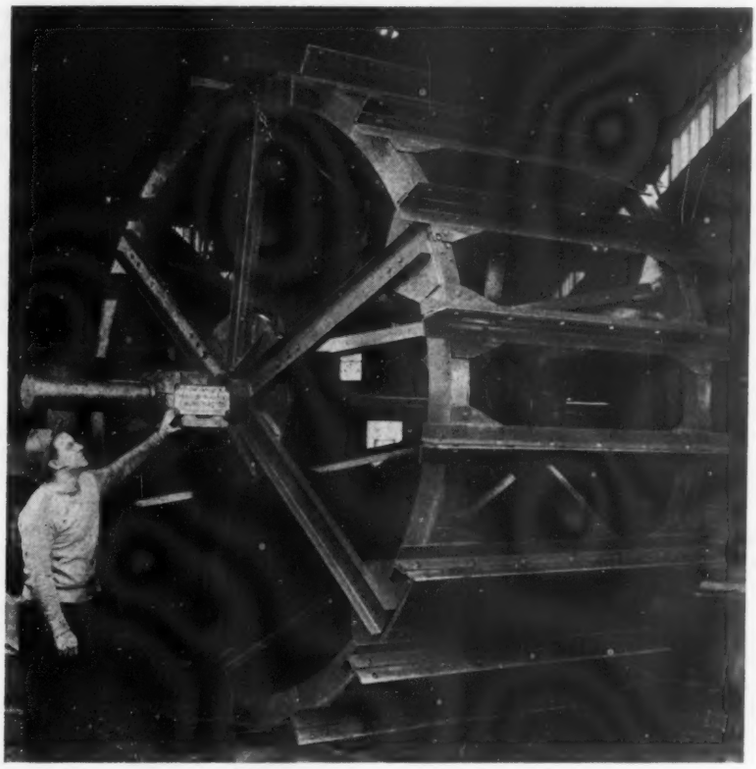


THEN AND NOW: While the bulldozer has come into its own as a military weapon during the present war, it has been in use for many years. Before 1920, power usually was supplied by horses, left. Below, a modern version is clearing war debris

OVEN ENGINEERING NEWS



Four-ton Dryer Wheel Handles Weftless and Woven Coated Fabric In IOE Fabric Processing Unit



Simple and effective systems for the processing of modern synthetic coated fabrics often present complex engineering problems.

Take the big dryer wheel shown above, for instance. It is the basis of an **IOE** system designed for processing coated and calendered weftless fabric, and makes many of yesterday's vexing problems look simple today. Twelve feet in diameter, it weighs four tons and revolves on a 6½-inch shaft, yet it is so delicately balanced and is driven at such closely controlled speeds that the finest materials ride gently over its work carriers without danger of marking or breakage. It handles woven materials up to 72 inches wide or weftless fabric containing as many as 50 ends per inch of fabric, under a maximum tension of 500 pounds per foot of fabric, *at the unprecedented speed of 100 yards per minute.*

Both dryer wheel and auxiliary drum processing equipment are driven by electronically-controlled magnetic clutch motors, synchronized with the main calender drive of the processing system. **IOE** "convection-plus" heating, assisted by properly designed dip tanks and excess material removal units, provides drying speeds commensurate with top handling speeds of the system.

Statistics on this wheel-type dryer are presented here as exemplary of the thorough and ingenious engineering which underlies every system designed and installed by the Industrial Oven Engineering Company, whether for tire fabric cementing, woven or weftless fabric latex dipping, coated fabric dipping and drying, or continuous material processing systems. **IOE** supplies creel rooms, unwind stands, dip tanks, roller coaters, dryers, wind-up stands and complete drive systems for rubber or plastic coated fabrics, as well as complete processing systems for the rubber, wire, paper and textile industries.

CALIFORNIA ENGINEER JOINS IOE STAFF

W. A. Clements

W. A. Clements, heating and instrument engineer of Glendale, Calif., has joined the **IOE** staff as district engineer in the California territory. Mr. Clements, a mechanical engineering graduate of the University of California, heads the Automatic Control and Equipment Company of Glendale.

Write for This Engineering Bulletin

"Blueprint for Industry — Part III", dealing with the **IOE** method of winding continuous materials of any kind, has just been issued. Write for it TODAY!

(This is No. 17 of a series. Reprints of previous advertisements will be sent free upon request.)

ENGINEERING **IOE** VERSATILITY

THE INDUSTRIAL *Oven Engineering* COMPANY

11621 DETROIT AVE., CLEVELAND 2, OHIO

Engineering Representatives in Principal Industrial Areas

★ ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON, W. 1, ENGLAND ★

MEN of INDUSTRY

W. B. HOLTON JR.

W. R. PERSONS

W. B. Holton Jr., president, the Walworth Co., New York, has been elected president of the Valve Manufacturers Association succeeding **Ernest Cochran**, vice president, Chapman Valve Mfg. Co., Indian Orchard, Mass. Other officers of the association were elected as follows: Vice presidents, **Lucien W. Moore**, manager, Valve & Fittings department, Crane Co., Chicago, **J. P. Ferguson**, sales manager, Reading-Pratt & Cady Division, American Chain & Cable Co., Reading, Pa., and **C. W. Burrage**, secretary, Lunkenheimer Co., Cincinnati; secretary-treasurer, **George A. Cooper**, New York City. Directors are: **C. C. Chamberlain**, sales manager, Jenkins Bros., Bridgeport, Conn., **Oliver F. Gang**, vice president, William Powell Co., Cincinnati, **C. W. Watson**, vice president, Detroit Brass & Malleable Co., Detroit, **Hugh Foster**, assistant sales manager, Darling Valve & Mfg. Co., Williamsport, Pa., **W. F. Crawford**, president, the Edward Valve & Mfg. Co. Inc., Chicago, and **Ernest Cochran**, vice president, Chapman Valve Mfg. Co., Indian Orchard, Mass.

—o—

G. R. Limestahl has been made superintendent of production at Mullins Mfg. Corp.'s plant No. 3 in Salem, O. He succeeds **W. J. Pfaff**, who has joined Round Oak Stove Co., Dowagiac, Mich., as works manager in charge of production.

—o—

Thomas W. Flood has been elected vice president in charge of equipment sales, Electric Auto-Lite Co., Toledo, O., and **John C. Clark**, New York city advertising executive, has been elected a director of the company.

—o—

E. J. Kelly has been made vice president in charge of engineering, Skilsaw Inc., Chicago, and **J. L. McManus** has become secretary of the company, succeeding Mr. Kelly. **E. B. McConville**, treasurer, has been elected to the board.

—o—

Raymond P. Townsend has been named vice president and general sales manager of the transportation department, Johns-Manville Sales Corp., New York.

—o—

W. R. Persons has been named assistant sales manager, Lincoln Electric Co., Cleveland. He will assist **C. M. Taylor**, vice president and general sales manager.

—o—

John H. Penfield has been made field service engineer in southern Connecticut for Rustless Iron & Steel Corp., Baltimore.

—o—

N. B. Cappel has become affiliated with Universal Steel Co., Cleveland, as sales representative to cover territory of the late George Bartley.

—o—

Lewis P. Wilson has joined Western Cartridge Division, Olin Industries Inc., East Alton, Ill., as research metallurgist.

—o—

Robert Simkins has been named vice president, Trundle Engineering Co., Cleveland, and will be in charge of western sales, with headquarters in Chicago. He succeeds **W. S. Ford**, who has resigned to resume private practice.

—o—

Thomas H. Kepner has been named production and procurement supervisor at the Emeryville, Calif., plant, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

—o—

Walter F. Myers has been appointed to the staff of the Washington office, Cooper Bessemer Corp., Mt. Vernon, O.

—o—

Helmuth G. Braendel has been appointed chief engineer, Wilkening Mfg. Co., Philadelphia. Formerly he was chief development engineer, Continental Motors Corp., Detroit.

—o—

Frank G. Flocke has joined Trent Tube Mfg. Co., East Troy, Wis., as general manager. Previously he was associated with the Technical Service, Development and Research Division, International Nickel Co., New York.

—o—

John B. Fenstermacher has been appointed special sales representative on the Pacific Coast for Ohio Steel Foundry Co., Lima, O., with headquarters in the Russ building, San Francisco.

—o—

Bert S. Cross has been made general manager, Scotchlite Division, Minnesota Mining & Mfg. Co., St. Paul.

—o—

H. M. Horner, president, United Aircraft Corp., New York, has been elected chairman and **J. Carlton Ward Jr.**, president, Fairchild Engine & Airplane Corp., New York, vice chairman of a newly-formed surplus advisory committee for the eastern region of the Aircraft Manufacturers Council of the Aeronautical Chamber of Commerce of America.

—o—

Charles R. Bellamy, chief engineer, gas department, Columbia Gas & Electric Corp., and vice president, Columbia Engineering Corp., has been appointed chairman of the committee on Industrial Gas Research, American Gas Association, succeeding **John W. Batten** of Detroit.

—o—

C. P. Chesney has been appointed sales and service engineer in the Illinois, Wisconsin and Missouri area for U. S. Broach Co., Detroit, to work with **V. E. Miles**. **Frank E. McGraw** has been named sales and service engineer in the Indiana, Ohio and Michigan territory, to work with **Clyde E. Hardin.**

—o—

William Stark Newell, president, Bath Iron Works, Bath, Me., has been given the honorary degree of Doctor of Engineering by Stevens Institute of Technology, Hoboken, N. J.

—o—

Soren H. Mortensen, chief electrical engineer, Allis-Chalmers Mfg. Co., Milwaukee, will receive the 1944 Lamme Medal of the American Institute of Electrical Engineers "for his pioneer work in the development of self-starting synchronous motors and for his contributions to the development of large hydraulic and steam turbine driven generators."

—o—

Frederick P. Huston has been placed in charge of railroad developments, Development and Research Division, International Nickel Co. Inc., New York.

—o—

Virgil S. Schory has been named manager of the Kokomo, Ind., plant of American Radiator & Standard Sanitary Corp., New York, succeeding **Sig B. King**, who has retired after 40 years with the company.

—o—

Edward C. Wells, chief engineer, Boeing Aircraft Co., Seattle, has been selected winner of the 1944 Fawcett Aviation Award of $1000 and the Fawcett

Trophy for his work in advancing long-distance flight as embodied in the B-17, B-29 and the Army's C-97.

—o—

Oliver E. Mount, secretary-treasurer, American Steel Foundries, Chicago, who retired recently as president, Steel Founders Society of America, after serving three consecutive terms, was honored Feb. 16 at a testimonial dinner in Chicago tendered by executives of steel foundries in the society's sixth district.

—o—

Dr. Arthur H. Compton, dean, division of physical sciences, and chairman, department of physics, University of Chicago, has received the Washington Award for 1945 "for his research and teaching in the physical sciences increasing man's knowledge of the action of X-rays and cosmic rays." This award is administered by the Western Society of Engineers.

—o—

Oliver H. Castle has been appointed manager of the Dallas district of American Machine & Metals Inc., with headquarters in the Mercantile Bank building, Dallas, Tex., **G. W. Johnson** has been named to head the Minneapolis district sales territory, with offices in the Foshay Tower building, Minneapolis, and **Harold N. Ewertz** has been made manager of the Philadelphia district, Philadelphia Savings Fund Society building.

—o—

F. A. Hofmann has been made vice president in charge of manufacturing, Elastic Stop Nut Corp. of America, Union, N. J., and **Charles Anderson Dana,** president and director of Spicer Mfg. Co., Toledo, O., was elected to the board.

—o—

Harris McIntosh has been elected vice president in charge of production and engineering, and a director, Toledo Scale Co., Toledo, O.

—o—

R. I. Ingalls Jr., president, Ingalls Iron Works Co. and vice chairman of Ingalls Shipbuilding Corp., Birmingham, Ala., has been made a member of the Committee on National Defense of the United States Chamber of Commerce.

—o—

Co-chairmen of the committee on light and heavy industry of the China-American Council of Commerce and Industry are **Ralph E. Flanders,** president, Jones & Lamson Machine Co., Springfield, Vt., and **Stanley W. Caywood,** general manager, International Division, B. F. Goodrich Co., Akron, O.

—o—

H. V. Ennis has been appointed assistant to **J. A. V. Scheckenbach,** vice president-manufacturing, American Car & Foundry Co., New York.

—o—

Leonard C. Blevins has been appointed sales manager, Meter Division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and **H. L. Buechner** has been named to succeed him as watt-hour meter sales manager. **Curtis W. Lehner** has been made southeastern district manager of the company's Home Radio Division, with headquarters in Atlanta, Ga.

EDWARD J. CHARLTON

GEORGE E. WESTERHOLM

—o—

Edward J. Charlton, since 1942 assistant to the president, Lukenweld, Inc., Coatesville, Pa., has been named manager, development engineering, for the Lukens Steel Co. and its subsidiaries, By-Products Steel Corp., and Lukenweld, Inc.

—o—

Duke Golden has been transferred from the Engineering Division, Perfect Circle Co., Hagerstown, Ind., to the Sales Division. As educational director of the Sales Division he will be responsible for training salesmen and development of engineering information for distribution and publication.

—o—

Charles Foster Glore, partner in Glore, Forgan & Co., investment bankers, has been elected a director of Stewart-Warner Corp., Chicago, to succeed **Gardiner Symonds,** resigned.

—o—

Earl L. Hadley, formerly advertising and promotion manager, Grigsby-Grunow Co., has been appointed director of advertising and sales promotion, Bendix Radio Division, Bendix Aviation Corp., Baltimore.

—o—

Carl E. Baird, mechanical engineer of the Bureau of Mines, has won the Department of the Interior's award of excellence and $1000 in cash for inventing an automatic cutoff valve to prevent pipe-line leakage of helium.

—o—

Howard A. Sommers has been named chief engineer of the Mathieson Alkali Works with headquarters in New York city. He has been with the Mathieson organization since 1925 serving in the Niagara Falls ammonia plant as mechanical engineer and assistant plant superintendent. Later he was superintendent of the dry ice and lime recovery plant at Saltville, Va., then assistant plant engineer at the Niagara Falls plant, project manager from the New York headquarters of the company, manager of the magnesium plant at Lake Charles, La., and project engineer in the New York office.

—o—

George E. Westerholm has been appointed to the executive staff of the Peninsular Grinding Wheel Co., Detroit. His duties will be concentrated in the engineering and production divisions of the company. Mr. Westerholm is well known in the grinding wheel field, his experience covering over 24 years of shop operation, field engineering and laboratory development.

—o—

Fred C. Wood has been appointed manager of the Washington national service office of York Corp., York, Pa., succeeding **Rodney F. Lauer,** who has been named district manager of the corporation's California operations.

—o—

Walter W. Patnoe, chief engineer, Basic Refractories Inc., Cleveland, has been appointed acting manager of operations.

—o—

Ross Rathbun has been appointed manager of the Air Conditioning Division, Westinghouse Electric Elevator Co., Jersey City, N. J., and **Walker G. White** has been named manager of the Elevator Division. **George F. Begoon** has been made manager of the precipitron department, Air Conditioning Division.

—o—

John F. Myers has been appointed Middle Atlantic district manager of Westinghouse Electric Supply Co., New York, succeeding **H. M. Gansman,** who will retire after almost 41 years with Westinghouse. **H. C. Lease** succeeds Mr. Myers as manager of the Washington branch.

—o—

P. N. Love has been appointed manager of industrial relations at the Can-

GEORGE L. MORRIS

Who has been elected vice president in charge of the Wire and Special Machinery Division, Syncro Machine Co., Perth Amboy, N. J., noted in STEEL, Feb. 5, p. 102.

C. FRED HASTINGS

Who has been appointed as general sales manager of the American Central Mfg. Corp., Connersville, Ind., as reported in STEEL, Feb. 5, p. 103.

ROY P. TOOKE

Who has been appointed assistant chief engineer of the General Engineering Division, American Rolling Mill Co., Middletown, O., noted in STEEL, Feb. 12, p. 81.

ton, O., Naval Ordnance plant operated by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

—o—

Max M. Roensch has been appointed chief engineer of the Cleveland Graphite Bronze Co., Cleveland, and will assume his new position April 1. He has been a member of the engineering staff of the Chrysler Corp., Detroit, for the past 19 years.

—o—

Ralph M. Ferry, manager of the New Kensington, Pa., works of the Aluminum Co. of America, has been promoted to the post of manager of Tennessee operations for the company with headquarters at Alcoa, Tenn. In his new post he will head up the company's largest producing and manufacturing unit.

—o—

Joel N. Cooper has been made supervisor of sales of alkali and emulsion cleaning materials, Detrex Corp., in the New England states with headquarters at Meriden, Conn.

OBITUARIES . . .

Walter W. Van Horn, prominent Ohio industrialist, died in Shelby Memorial hospital, Shelby, O., Feb. 22. He was 69. For many years he was identified with industry in Ohio, chiefly in Shelby. He was president of the Shelby Salesbook Co., chairman of the board of directors of the Autocall Co., vice president of the Ohio Seamless Tube Co., president of the Shelby Metal Products Co., and chairman of the board of directors of the Citizens Bank of Shelby. Early in his business career he was associated with the Shelby Electric Co., being manager of the organization when it was taken over by the General Electric Co. Mr. Van Horn was active in civic and philanthropic affairs and was a member of a number of clubs and associations including the Union Club of Cleveland.

—o—

George Warren Nichols, 69, once secretary-treasurer, Stewart Iron Co., Cleveland, which was later reorganized into the Stewart Furnace Co. until it was liquidated in 1936, died March 4 in Birmingham, Mich.

—o—

T. W. Burns, 58, former executive of the National Supply Co. at Springfield, O., died recently at Okauchee, Wis. Prior to 1933, Mr. Burns was works manager, Beloit plant, Fairbanks, Morse & Co., when he resigned to become works manager, A. O. Smith Corp., Milwaukee, for 5 years.

—o—

William Baker, 48, vice president, Baker Bros. Inc., Toledo, O., who has been serving the Navy for the past two and one-half years, holding the rank of lieutenant commander, U.S.N.R., died March 3 in Huntington, N. Y.

—o—

Louis Emerich, 59, for 20 years secretary and treasurer, Continental Piston Ring Co., Memphis, Tenn., died Feb. 21 in Keiser, Ark.

—o—

Robert H. Neill, 27, research engineer, American Steel & Wire Co., Cleveland, died recently there.

—o—

Andre G. Trachenberg, 87, retired secretary of the former Snow Steam Pump Works, which later became the Buffalo Division, Worthington Pump & Machinery Corp., died March 4 at Buffalo.

—o—

William F. Donovan, 92, formerly president, Atlas Tack Co., Boston, died at his home in Scarsdale, N. Y., recently.

—o—

Albert E. Robinson, assistant to the president and consultant on mechanical matters and new machine design for the American Tool Works, Cincinnati, died Feb. 28. He had been associated with the company for 61 years. In 1943 he was made vice president and director but later at his own request was given less arduous duties. He was an authority on machine tool design.

—o—

James Lincoln Ashley, 75, director, International Nickel Co. of Canada, Ltd., Toronto, died March 6 in New York. He was formerly secretary and treasurer of the Canadian company and vice president and treasurer, International Nickel Co. Inc., New York.

—o—

William Ewert, 40, superintendent, Cornell Forge Co., Chicago, died Feb. 28 in that city.

—o—

Alfred C. Funk, 78, retired manager, Trenton, N. J., plant, American Bridge Co., died Feb. 27 in that city.

—o—

Garth Griffith Gilpin, 62, vice president of engineering, Standard Railway Equipment Mfg. Co., Chicago, died Feb. 25 at Wickenburg, Ariz.

—o—

Franklin C. Snow, 62, dean of the School of Engineering, Georgia School of Technology, Atlanta, Ga., died March 2 in that city.

—o—

Karl A. Lindner, 53, director of research, American Smelting & Refining Co., New York, died March 3 at Scotch Plains, N. J.

California Shipbuilding Slackens; Yards Converting to Repair Work

Other industries in San Francisco Bay area absorb workers released. Swing shifts being curtailed or eliminated by some companies. Absentees and incompetents being furloughed. Calls for essential workers off nearly 40 per cent

SAN FRANCISCO Bay area's wartime shipbuilding is beginning to slacken, and the companies gradually are cutting down the total number of employes.

However, the district remains a critical labor area. Other war industries need workers, and there are shortages in local transportation and oil refineries. Shipyards, too, are shifting men over to repair work for the Navy, and the big repair yards at Hunter's Point and Mare Island have a standing order in the labor market for more help.

All major yards in this area still are in operation. Of the four Kaiser facilities in Richmond, three are producing troop transports, tankers, and Victory cargo ships; the other yard, Richmond No. 3, is being converted to repair work. Moore Drydock Co. in Oakland is making combat troop and freight carriers for the Navy. Marinship Corp., in Sausalito, is building tankers; and Western Pipe & Steel Co., South San Francisco, is making cargo ships. Bethlehem Steel Corp.'s yard in the East Bay is turning out troop transports and its yard in San Francisco largely is working on repairs.

May Concentrate on Repair Work

When the 1945 contracts were let, no San Francisco area yard was awarded more ships to build, with the exception of a few tankers for Marinship. And unless further contracts are awarded soon, nearly all of the San Francisco program will be completed by the fourth quarter this year. Although it has not definitely been stated as policy, this appears to indicate an intention to concentrate on repair work in this area.

At the peak of shipyard employment in 1943, privately operated yards in the San Francisco region had 181,000 workers on their payrolls (government-owned and operated yards had an estimated 120,000 at the peak). During 1944 private yard employment declined steadily to an average of 154,000 for the year, off 15 per cent from the peak. Currently, employment is under 140,000.

Skilled workers still are being hired, but the yards generally are weeding out less essential employes. Absentees, incompetents and those with few or no skills are being laid off. Some yards thus far have curtailed swing or graveyard shifts. One company, Western Pipe & Steel, has eliminated its graveyard shift entirely. Western Pipe also has been giving releases to those workers who want to take other employment and whom the company has been holding more or less against their will.

Workers let out of shipyards are being interviewed by the War Manpower Commission and the U. S. Employment Service with a view to placing them on other critical jobs.

However, the trend is toward a surplus of labor, even though that time still may be far distant. Several months ago, orders on file with government agencies for essential workers totaled about 25,000. Six weeks ago the number had been reduced to 19,000. Now it is about 16,000.

Survey of Postwar Needs of Western States Underway

A survey of the postwar needs of the 11 western states for civilian goods and the facilities for producing such goods on the Coast is being undertaken by the Los Angeles Chamber of Commerce. The Los Angeles district alone has 7500 manufacturing concerns, compared with 5594 in 1939, and local industrialists naturally are interested in maintaining as many of these enterprises as possible.

A newly formed committee will direct the campaign under the chairmanship of Everett J. Gray, executive of Crowncraft Engineering Co. The study will be directed particularly to postwar distribution of equipment for general manufacturing, food processing, metal, mining, petroleum, woodworking, textile, apparel, electrical and shipbuilding industries as well as for automobile, aircraft, plastics and rubber developments.

Surplus Disposal Program In West Launched by RFC

Surplus war material disposal is scheduled for early expansion on the Pacific Coast.

Reconstruction Finance Corp. is setting up an active program in addition to the Treasury Department's system which has been in operation some time.

Entry of the RFC into the disposal picture not only is intended to provide means of disposing of surpluses, but also to provide for transfer of necessary war materials from contractors who no longer need it to those who want it badly.

POSTWAR PRODUCT: When limitations on metals and manpower are relaxed, Food Machinery Corp., San Jose, Calif., plans to go into extensive production of power sprayers for a score of farm uses. Above, such a sprayer is being used to spray a solution of molasses and water on dry grass; the molasses makes the dry grass palatable to cattle and aids in fattening them. Other uses include spraying of buildings with paint or whitewash, disinfecting buildings, spraying fruits and vegetables, and similar tasks

WING TIPS

New jet engine drives propellerless Lockheed P-80 fighters faster than any other plane, according to manufacturer. Produces twice the power of earlier jet models. Makes virtually no vibration, reducing pilot's fatigue

FIRST official announcement of the Army Air Forces newest jet-propelled fighter plane, the Lockheed P-80 Shooting Star, was permitted recently. It has been flying for over a year and is now in the early stages of quantity production at Lockheed plants in Burbank, Calif., and at the Kansas City, Kans., plant of North American Aviation Inc.

The P-80 is described by the AAF as the fastest airplane in the skies, with "substantial" operating range. Power is supplied by a new and larger turbojet engine being built by General Electric Co. and the Allison Division of General Motors Corp., Indianapolis.

The single engine used is larger and considerably more powerful than the turbojet engines, two of which are mounted in nacelles to power the Bell P-59A jet-propelled fighter plane, now considered to be only a trainer in this class of aircraft. The Lockheed P-80 doubtless has its single engine mounted centrally in the fuselage, with air intake through wing vents and exhaust through the tail, an arrangement similar to that used in the Italian Campini-Caproni JP model. The P-80's engine is claimed to be more powerful than any other aircraft engine in production, but how this conclusion is reached is not entirely clear, since jet engines are rated in terms of pounds of thrust and not horsepower; hence a comparison with the conventional reciprocating internal combustion engine would be difficult.

The new GE jet, installed in the tail of the P-80 Shooting Star, produces more than twice the power of the earlier model of jet engines first produced by General Electric for the AAF.

The tremendous power of this relatively light engine gives the great advantage of top speed to the P-80 Shooting Star. At this lightning-like pace the P-80 is highly maneuverable, and control of the GE jet is so simple that AAF pilots have found the planes powered by it easy to fly.

Air to the jet engine in the P-80 rams into vents in the front of the wings, almost flush against the fuselage. It pours through the vents to the engine, where it is compressed by a swiftly revolving impeller. At extremely high altitudes the air will be as cold as 75 degrees below zero. The air is whipped by the impeller to a combustion chamber, where fuel (usually kerosene) burns fiercely. This causes the air to expand and increases its velocity. The air and gases then pass through a blazing-hot turbine wheel, which is connected by shaft with the impeller. The blast then passes out the jet exhaust at the rear tip of the plane, giving the drive or forward thrust.

This reactive thrust, which drives the Shooting Star and other jet planes forward, is so simple that it sometimes is hard to understand. It conforms with Newton's third law of motion: That to any action there is an equal and opposite reaction. A simple example is a garden spray of the spinner type, which revolves in the opposite direction from which the spray streams go.

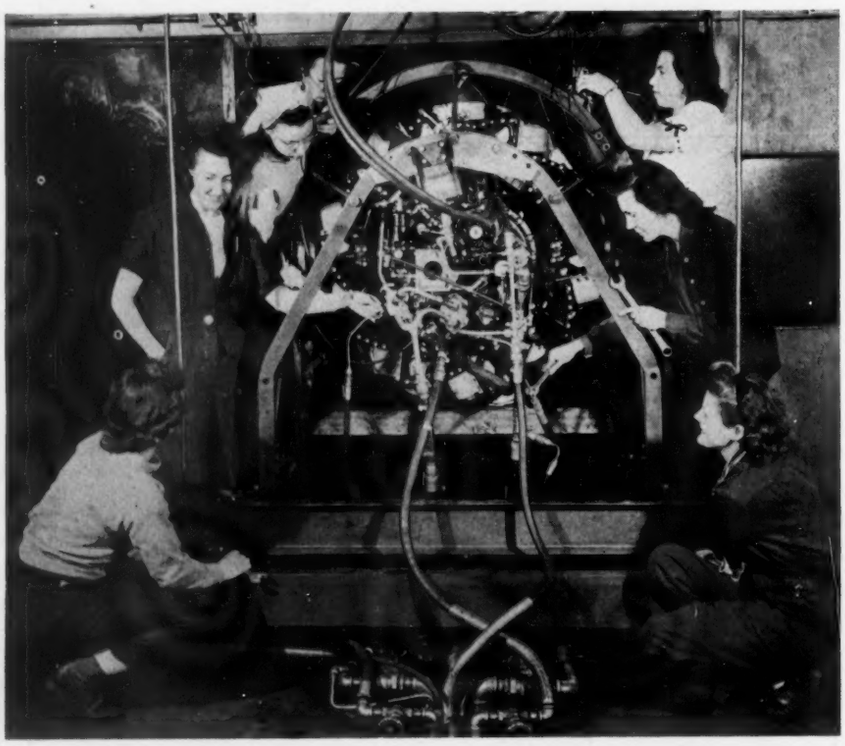
The new jet makes virtually no vibration, lessening fatigue for the pilot. It is simple to maintain, having few movable parts. Pilots of a P-80 hear no noise from the jet while in flight. The rumbling roar from it passes out the rear.

Another outstanding performance characteristic of the P-80 is its high altitude maneuverability. The jet functions powerfully and smoothly at extremely high altitudes. Due to less air drag on the plane, the jet uses much less fuel at high altitude than it does going at the same speed at low altitude.

Another advantage of this new super jet engine is that it requires no warm up. It develops more than enough power for a take-off in less than a minute.

The P-80 Shooting Star has a pressurized cabin, hydraulic aileron boost and electrically operated wing flaps, the latter two features being incorporated in late models of the Lockheed P-38 fighter as well. No further details of construction or operation have been released as yet, beyond the fact the rate and angle of climb are said to be "superlative".

One of the principal drawbacks to jet-propelled planes has been their limited range from the standpoint of time, something under 60 minutes being the usual operational period on a full load of fuel. The P-80 is believed to be capable of operating well beyond the 1 hour limit, at speeds in excess of 600 miles per hour.



Newest of airplane engines, the GE jet, is shown being connected for test at the Lynn, Mass., plant of General Electric. This is the first picture to be released with approval of the War Department, showing the turbojet. GE is building turbojets for the P-80 Shooting Star, recently announced by the War Department as the world's fastest fighter plane

Voluminous Repair Data Kit for B-32 Prepared

Reversing the customary policy hither to adopted in the production of a new model military plane, Consolidated Vultee Aircraft Corp. has completed a 2343 page technical data kit covering the operation, servicing and repair of its new B-32 Dominator four-engine bomber, in advance of actual volume production of the airplane itself. The kit is in the form of a 63-pound set of 12 books containing among other things 389 numerical drawings, 935 blueprints and 27 pages of electrical wiring diagrams. Each kit is enclosed in a wooden case 3

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inches long, kept padlocked at all times when not in use because of the restricted nature of the data. It was developed by the Convair service department at the Ft. Worth, Tex., division.

The B-32, said to be a counterpart of the B-29 Superfortress designed by Boeing, was conceived at about the same time, but production was deferred until all operational bugs were observed in the B-29 and until sufficient testing had been carried out on the B-32 to avoid some of the mistakes encountered with the Superfortress.

The AAF has permitted announcement that the Dominator now is in production at Consolidated's San Diego plants, but no details have been forthcoming. However, it has been reported that the pressurized cabin system featured in the B-29 has been dispensed with in the B-32 in view of flight experience gained with the B-29. Explosive decompression of a pressurized cabin at high altitude can be serious to personnel and equipment, the alternative being the use of individual oxygen masks by the crew.

Some difficulty also is involved in effectively sealing a pressurized cabin, particularly around windows. One of the glass companies has developed a new plastic material which provides a flexible seal around windows on the B-32 and is reported to be eminently successful, even surviving crash tests.

The technical data kits for the B-32 are so arranged that each one includes all material and all changes made in the airplane up to and including the day the kit is shipped. As subsequent changes develop, notices are issued for incorporation in the kit.

Seven Long-Distance Records Set by C-54

Seven world's flight records, all trans-ocean, have been set by long-range Douglas C-54 Skymasters in recent months, an Air Transport Command recapitulation discloses.

The latest covered the 11,000-mile Miami to Calcutta route in the spectacular flying time of 46 hours, 45 minutes at an average cruising speed of 230 miles per hour.

The other six world's records were made by a single Skymaster piloted by Lt. Col. Henry T. Myers, as follows:

London to Washington, 3800 miles non-stop, in 17 hours, and 50 minutes.

Rio de Janeiro to Washington, 5300 miles, within 24 hours with two stops, the only known instance of an airplane flying so far in one day. Actual flight time was 22 hours and 55 minutes.

Washington to Paris, 3600 miles, in 18 hours.

Washington to Naples, 4200 miles, in 24 hours with two stops.

Los Angeles to Honolulu, 2200 miles, non-stop in 10 hours and 40 minutes.

Honolulu to Alaska, 2600 miles non-stop, 12 hours.

Droppable Fuel Tanks Now Being Used To Transport Wounded, Five to a Unit

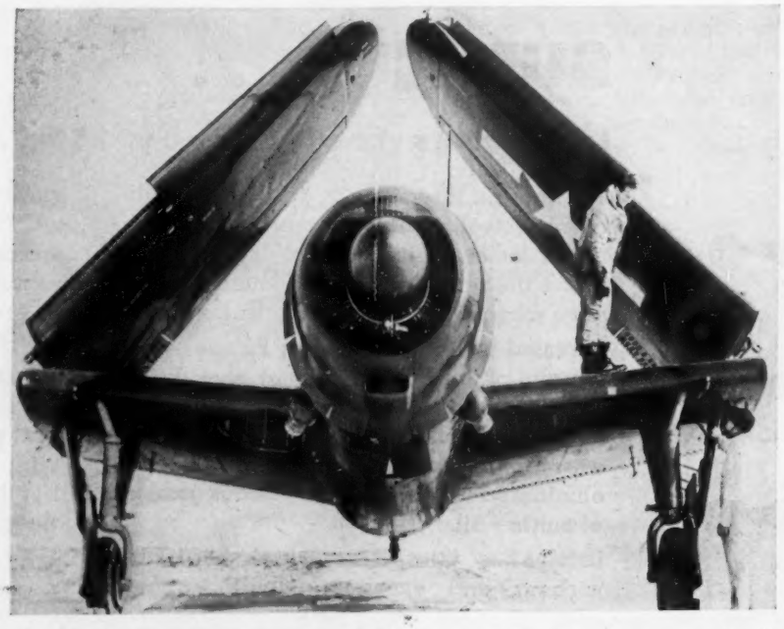
YANKEE ingenuity and Air Technical Service Command engineering genius have developed a new use for airplane droppable fuel tanks. At the suggestion of Lt. Gen. Barney M. Giles and Maj. Gen. W. E. Kepner, engineers of the ATSC power plant laboratory at Wright Field, O., in co-operation with the American Aero Supply Co., Los Angeles, began work on an idea said to have originated through G.I.'s sending beer in wing tanks to thirsty buddies in dry areas. Soon after, as the idea spread, V-mail and cargo was transported in the tanks. Fighter pilots found another use for the tanks, dropping them, full of gasoline, on enemy ships and armored equipment and setting destructive fires. But the next idea topped everything—when fliers asked, "If we can ship cargo, mail and medical supplies why not try men?"

With this basic thought, the American Aero Supply Co. began design work. A standard drop tank contains baffles to prevent lurching of gasoline, which, if not controlled, would cause abrupt changes in the center of gravity making aircraft difficult to handle. First cargo version of the drop tank still had these baffles limiting cargo to small packages. This design was finally rejected by the engineers of the power plant laboratory at Wright Field.

Then an almost complete change from the original was made. The original drop tank was completely redesigned, retaining only the tear drop shape and its shackles. The new unit resembled a small aircraft fuselage in overall design.

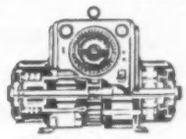
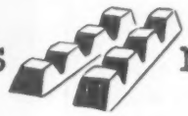
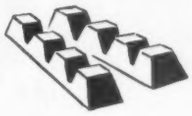
The new tank was completed early in September, 1944. It had a transparent nose, controllable air vents, a new type of shackle that prevents its being salvoed by the pilot until occupants also set releases. With the addition of wooden flooring a litter can be inserted, tail of the tank attached and a wounded man carried to or from fields too small for larger planes. Standard equipment consists of a mattress running the full length of the tank and a cushion which can be secured from the top to provide a backrest. The stripped tank weighs only two hundred pounds which leaves a margin of 1800 pounds for equipment, cargo or men. It was found that five men can be carried in the unit.

The new tanks also make it possible for a fighter to return from a reconnaissance mission, land, change tanks and take off within minutes as an ambulance plane or long range fighter.



NEW HELLDIVER: Looking deadlier than ever in the Navy's new midnight blue camouflage, this Curtiss SB2C-4, latest version of the Helldiver, carries one of the most destructive loads ever mounted on a single-engine plane. It mounts a 20-millimeter wing cannon, eight 5-inch rockets, and wing bomb racks carrying a 1000-pound load in addition to a secret internal rack reported to carry more than 1000 pounds. NEA photo, passed by Navy censors

An arc welder needs "innards" to stand up under the strain of present day operation

well sir, HOBART has more "innards" than most arc welders. The liberal design  of a HOBART you'll find has  more copper, more steel,  more good insulation, precision bearings and accurate controls, all engineered into a simplified arc welder which makes its performance stand out head and shoulders above the pack.

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Group Gets Set To Work Under War Handicaps

New committees will aid Washer and Ironer Manufacturers' Association to function during convention ban

TEN appointive committees, five of them established to perform new duties, will head up activities of the American Washer and Ironer Manufacturers' Association in 1945.

Under this new arrangement, committees will be able to assemble, deliberate and record their decisions for benefit of the full membership of the association now when limitation upon the size of meetings make it impossible for the association as a whole to study the problem faced by the industry, according to Louis C. Upton, president, Nineteen Hundred Corp., St. Joseph, Mich., and new president of the association.

One of the new groups is the association committee, giving administrative recognition to suppliers to the industry who constitute the organization's associate membership. That committee is headed by Carl Huff, Bliss & Laughlin Inc., Harvey, Ill. The other new committees are ironer and dryer; finance; government; and industrial relations.

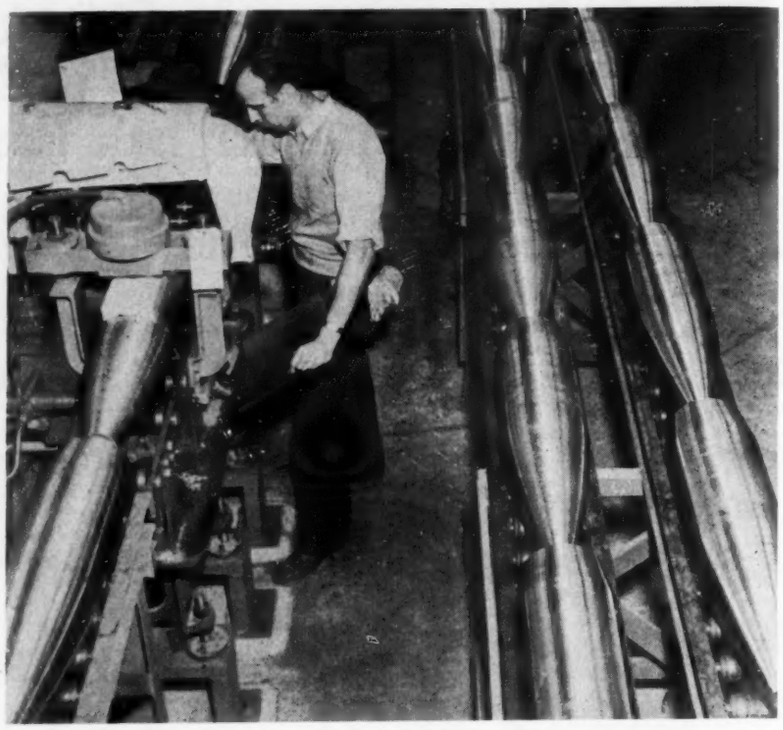
Three committees conducting old activities under slightly altered titles are: Advertising and market research; engineering and research; and international markets and trends. The association's other two committees are the Washington-named OPA and WPB committees representing the industry.

All committees will work closely with the organization's newly elected executive committee and their chairmen will participate in that committee's meetings.

Battelle Institute To Expand Research Education Work

Expansion of research education at Battelle Memorial Institute, Columbus, O., is planned to help America maintain its top-flight position in science, Clyde Williams, Battelle director, announced.

The program will be of special interest to returning veterans who can qualify for training as research workers in the sciences. Directed at the graduate level of education, the program is an expansion of the plan which has been markedly successful thus far with the Ohio State University. Battelle's expanded plan of research education is designed to add to the country's store of scientific knowledge, as well as to train young scientists.



HEAVY SHELLS: Eight-inch shells are being manufactured in quantity at the Bustleton, Pa., plant of the Edward G. Budd Mfg. Co., as part of one of the largest heavy ammunition contracts recently awarded by the Army

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Vierling Steel Works, Chicago, which recently sustained fire damage, has temporarily located its office in Room 1035, 53 West Jackson boulevard. The firm's structural steel shop and gray iron foundry were not damaged and are operating as usual.

—o—

Kaiser Engineers, Oakland, Calif., is a new organization of engineers long associated with Henry J. Kaiser. Organization of this group will make available to others the engineering talent which has been responsible for the design of many of the Kaiser projects.

—o—

Apex Tire & Rubber Co., Pawtucket, R. I., has purchased the James H. Tower Iron Works, Providence, R. I., plate and structural fabricators. The structural fabricating shop will be continued separately from Apex and without change in management.

—o—

Pittsburgh Coal Co. and Consolidation Coal Co., Pittsburgh, announce that their officers have reached a tentative agreement on a basis for eventual merger of the two bituminous coal companies.

American Engineering Co., Philadelphia, has introduced a new car puller in which the barrel, gear box and motor are integrated in a single, streamlined unit.

—o—

Moltrup Steel Products Co., Beaver Falls, Pa., has appointed Howard H. Heinz Inc., Detroit, as its sales representatives for Michigan.

—o—

Bureau of Mines is starting the greatest single helium storage reservoir in the world by pumping the gas into the ground in the 50,000-acre government-owned Cliffside natural gas field in Texas.

—o—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has purchased the Atlantic Elevator Co., Philadelphia.

—o—

National Steel Corp., Pittsburgh, has declared a dividend of 75 cents a share on its capital stock for the first quarter of 1945.

—o—

Gould Storage Battery Corp., Depew, N. Y., has announced the new address of its Cleveland representative, Harry G.

Frank, is the Corlett building, 1935 Euclid avenue.

—o—

Yellow Cab Co., Cleveland, using Motorola radio F-M transmitting and receiving units to direct operations of part of its taxi fleet, is seeking government permission to install such units in 100 additional cabs.

—o—

Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill., set a production record for February by turning out 668 freight cars.

—o—

American Steel & Wire Co., Cleveland, has issued a new manual of aircraft materials, including data on all types of cold-rolled strip, wire and wire products.

—o—

Eastern Stainless Steel Corp., Baltimore, has appointed the John Mather Lupton Co., New York, as advertising and marketing counsel.

—o—

Stacey Bros. Gas Construction Co., Cincinnati, is to build a five million cubic foot telescopic gas storage holder for the city of Long Beach, Calif.

—o—

American Can Co., New York, will double production this year on specially designed metal boxes used to encase carbine and machine gun ammunition for field distribution.

—o—

Peerless Furnace Co. and Peerless Foundry Co., Indianapolis, sustained $250,000 damage from fire recently.

—o—

Cooper-Bessemer Co., Mt. Vernon, O., is distributing to its employes a handbook containing details about the firm's suggestion plan.

—o—

American Central Mfg. Corp., Connersville, Ind., has completed negotiations for purchase of physical properties of the adjacent Steel Kitchens Corp.

—o—

United States Steel Corp., Pittsburgh, announced that nearly four and one-half million people viewed films it produced in 1944.

—o—

Battelle Institute, Columbus, O., is preparing for the American Society of Metals a complete subject and author index of all metals literature published the past year.

—o—

American Engineering Co., Philadelphia, has completed negotiations for acquisition of the entire outstanding stock of Cochrane Corp., Philadelphia, and Faraday Electric Corp., Adrian, Mich.

—o—

Steel Conversion Corp., Las Vegas, Nev., is to build an industrial plant there.

—o—

Brown Instrument Co., Philadelphia, announced that five major improvements will make its compensated radiation pyrometer secure against air and gases up to one pound per square inch gage pressure at temperatures up to 250 degrees, Fahr.

—o—

Mid-State Engineering Co., Champaign, Ill., has a $150,000 expansion program to equip a leased building there for a sheet metal shop.

—o—

Fred D. Kyle Co., Los Angeles, construction engineers, purchased the W. F. MacGlashan Industries (steel fabrication), Alhambra, Calif.

—o—

Park Chemical Co., Detroit, announced its pension trust fund for all its wage and salaried workers has received U. S. Treasury approval.

January Alloy Steel Output Makes Sharp Gain

Alloy steel production in January totaled 907,896 net tons, gain of almost 60,000 tons over the 848,274 tons produced in December, according to the American Iron and Steel Institute. In January, 1944, alloy steel output was 919,017 tons.

The total was made up of 609,716 tons of open-hearth alloys and 298,180 tons of electric furnace alloys. Ingots accounted for 897,729 tons and steel for castings 10,167 tons. By districts, alloy steel production was as follows: Eastern district, 185,319 tons; Pittsburgh-Youngstown, 471,276 tons; Cleveland-Detroit, 96,370 tons; Chicago, 151,437 tons; Southern, 945 tons; Western, 2549 tons.

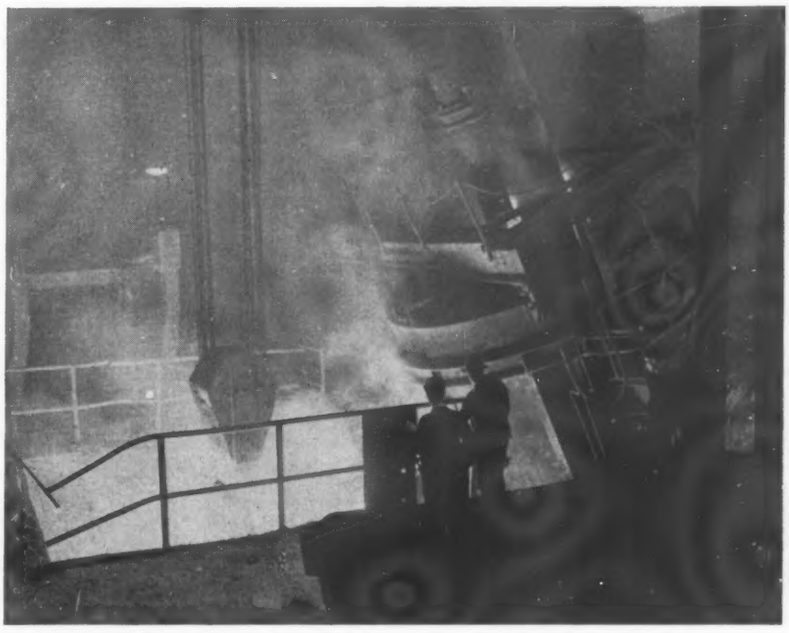
January Pig Iron Production Cut by Severe Weather

Month's output second lowest since June, 1943. Large part of loss attributed to congestion in railroad shipments

PRODUCTION of pig iron, ferromanganese and spiegeleisen in January declined to 4,945,018 net tons, from 4,998,757 tons in December, a large part of the loss being due to adverse weather conditions affecting railroad shipments, the American Iron and Steel Institute reports.

Output in January, 1945, was the lowest since June, 1943, with the exception of November, 1944, when it was only 4,904,011 tons. Details follow.

Districts	Pig iron	Ferro, spiegel	Total	% capacity
Eastern	831,349	24,814	856.163	77.6
Pittsburgh-Youngstown	1,980,251	19,257	1,999,508	90.8
Cleveland-Detroit	476,176	.....	476,176	85.1
Chicago	1,078,944	.....	1,078,944	90.3
Southern	348,669	13,335	362.004	86.5
Western	172,223	.....	172,223	71.5
Total	4,887,612	57,406	4,945,018	86.5



ONE MILLIONTH TON: Third largest electric furnace alloy steel producer in the country, Copperweld Steel Co., recently poured its millionth ton at Warren, Ohio, with appropriate ceremonies. Beginning operations Oct. 1, 1940, this plant since has used its entire facilities for the war effort, including production of aircraft quality steels

THE BUSINESS TREND

Industrial Production Pace Shows Upward Tendency

PACE of industrial activity recorded encouraging gains in recent weeks reflecting the general clearing up of the transportation "log-jam" that disrupted production schedules throughout January and first half of last month. This upward trend in production should continue throughout the first half this year if the all-time peak in output scheduled for June is to be reached.

Steel ingot production has recovered to the level in effect during the closing weeks of last year. Order backlogs on steel producers' books are the largest for the war period to date, despite a slight tapering in new demand the past ten days. Upturn in bituminous coal production, engineering construction, revenue freight carloadings and electric power consumption again occurred during the latest period. All these industrial indicators are substantially above the levels registered throughout January.

STEEL FORGINGS — December shipments of steel forgings amounted to 376,827 net tons, an increase of 5 per cent over the November output and 3 per cent above that registered in the like 1943 month, the Bureau of Census states.

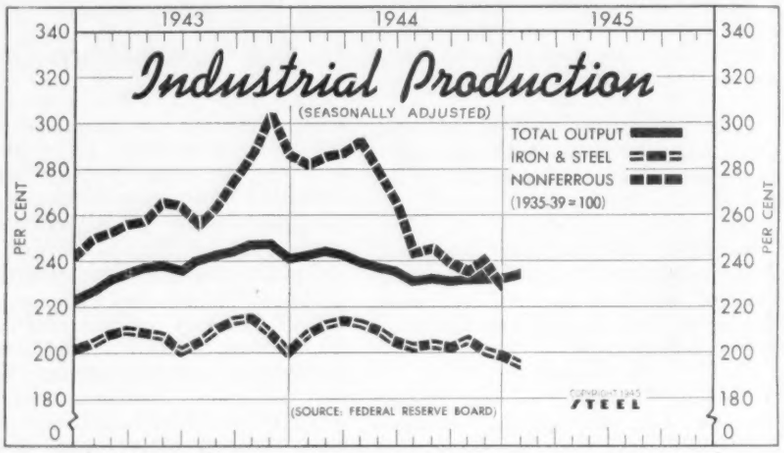
On Dec. 31 last, unfilled orders totaled 2,407,962 net tons, a gain of 13 per cent over the volume on the same date last year but 4 per cent lower than on Nov. 30, 1944. Unfilled orders for drop and upset forgings accounted for 56 per cent of the December total, the remainder representing hammer and press forgings.

Steel consumed in the production of steel forgings in December amounted to 505,635 net tons, of which 278,792 tons were consumed in the production of drop and upset forgings and 226,843 tons in output of open hammer and press forgings.

FRB's PRODUCTION INDEX—Total output in factories and mines rose slightly during January, resulting in a 2 point rise in the Federal Reserve Board's production index to 234 per cent of the 1935-39 average. This compares with an index figure of 243 recorded in the like 1944 month and peak of 247 reached in October and November of 1943.

Output of coal increased in January but the tonnage was 8 per cent less than that produced in the comparable 1944 month. Production of open hearth and bessemer steel in January was at the lowest rate since July, 1942, largely due to the severe weather conditions in several important steelmaking centers. Output of electric steel, however, which had been declining since the end of 1943, rose 10 per cent in January, reflecting new military requirements.

Activity in munitions industries was maintained in January at the December rate, although slight increases were scheduled, the board states.



Federal Reserve Board's Production Indexes

(1935-39 = 100)

	Total Production			Iron. Steel			Nonferrous	
	1945	1944	1943	1945	1944	1943	1944	1943
January	234	243	227	196	208	204	281	250
February	...	244	232	...	212	208	285	252
March	...	242	235	...	214	210	286	256
April	...	239	237	...	213	209	292	257
May	...	237	238	...	210	208	279	266
June	...	235	236	...	204	201	264	264
July	...	231	240	...	202	204	243	256
August	...	232	242	...	203	210	245	264
September	...	231	244	...	202	214	239	277
October	...	232	247	...	206	215	236	286
November	...	232	247	...	201	209	239	304
December	...	232	241	...	198	200	229	277
Average	...	236	239	...	206	208	260	267

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	96.0	96.0	91.0	97.5
Electric Power Distributed (million kilowatt hours)	4,472	4,474	4,539	4,465
Bituminous Coal Production (daily av.—1000 tons)	1,975	1,919	1,937	2,096
Petroleum Production (daily av.—1000 bbls.)	4,765	4,778	4,723	4,413
Construction Volume (ENR—unit $1,000,000)	$38.9	$16.3	$28.7	$39.4
Automobile and Truck Output (Ward's—number units)	18,545	21,015	20,770	19,155

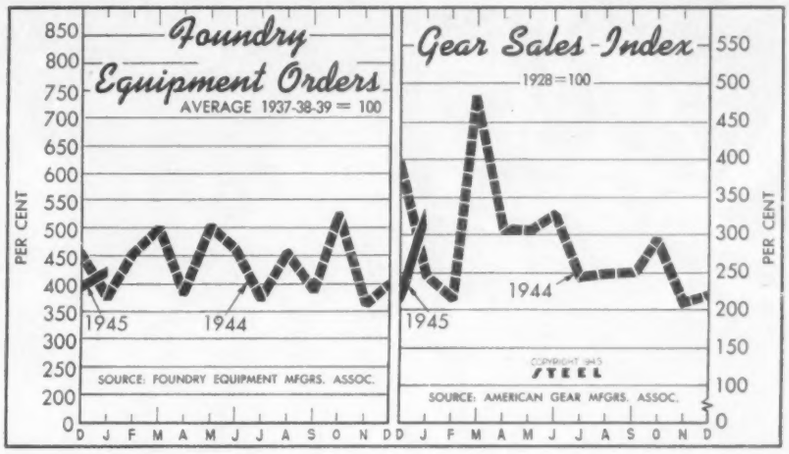
*Dates on request.

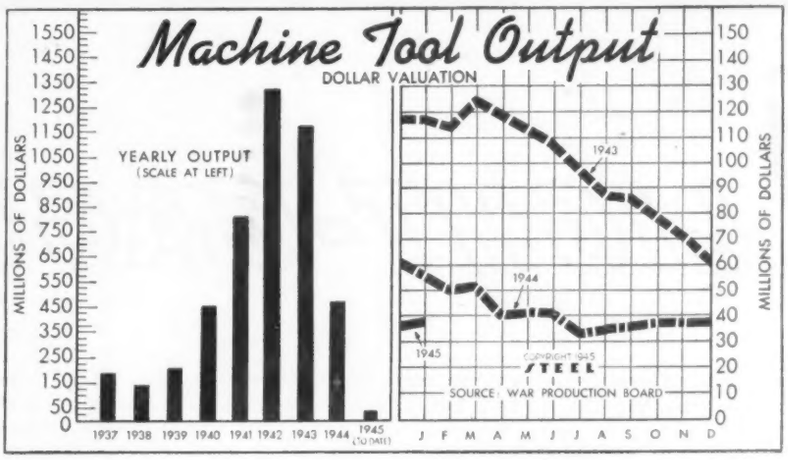
TRADE				
Freight Carloadings (unit—1000 cars)	780†	771	739	788
Business Failures (Dun & Bradstreet, number)	18	14	16	24
Money in Circulation (in millions of dollars)‡	$25,750	$25,652	$25,290	$20,823
Department Store Sales (change from like week a year ago)	+24%	+21%	+11%	−9%

†Preliminary. ‡Federal Reserve Board.

Foundry Equipment and Gear Sales

	Monthly Average 1937-38-39=100)			Index (1928=100)		
	1945	1944	1943	1945	1944	1943
Jan.	422.4	442.8	429.8	323	246	268
Feb.	....	378.3	399.5	...	214	303
Mar.	....	456.8	562.7	...	485	334
Apr.	....	385.7	362.7	...	308	240
May	....	503.9	348.9	...	305	342
June	....	466.1	413.6	...	328	401
July	....	375.8	379.4	...	242	374
Aug.	....	450.5	390.4	...	247	312
Sept.	....	388.0	346.6	...	248	320
Oct.	....	526.5	436.6	...	293	368
Nov.	....	369.5	388.0	...	209	387
Dec.	....	397.4	442.8	...	219	387
Avg.	....	426.9	440.3	...	279	336





Machine Tool Output

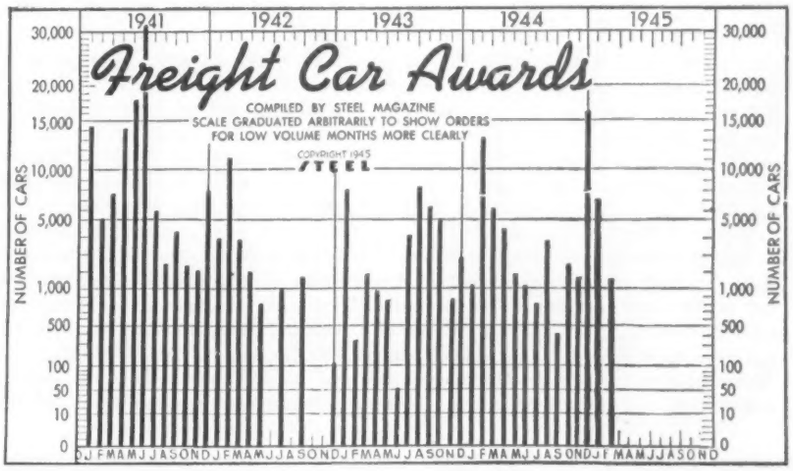
(000 omitted)

	1945	1944	1943	1942
Jan.	$37,498	$56,363	$117,384	$83,547
Feb.	.....	50,127	114,594	84,432
Mar.	.....	51,907	125,445	98,358
Apr.	.....	41,370	118,024	103,364
May	.....	41,819	113,859	107,297
June	.....	41,471	108,736	111,090
July	.....	32,753	97,428	113,596
Aug.	.....	35,177	87,405	117,342
Sept.	.....	35,876	85,842	119,883
Oct.	.....	37,516	78,300	130,008
Nov.	.....	36,277	71,811	120,871
Dec.	.....	36,782	60,861	131,960

Year	
1944	497,438
1943	1,179,689
1942	1,321,862
1941	812,462
1940	450,000

Freight Car Awards

	1945	1944	1943	1942
Jan.	7,200	1,020	8,365	4,253
Feb.	1,750	13,240	350	11,725
March	....	6,510	1,935	4,080
April	....	4,519	1,000	2,125
May	....	1,952	870	822
June	....	1,150	50	0
July	....	795	4,190	1,025
Aug.	....	3,900	8,747	0
Sept.	....	400	6,820	1,863
Oct.	....	2,425	5,258	0
Nov.	....	1,065	870	0
Dec.	....	16,245	2,919	135
Total	....	53,221	41,355	26,028



FINANCE

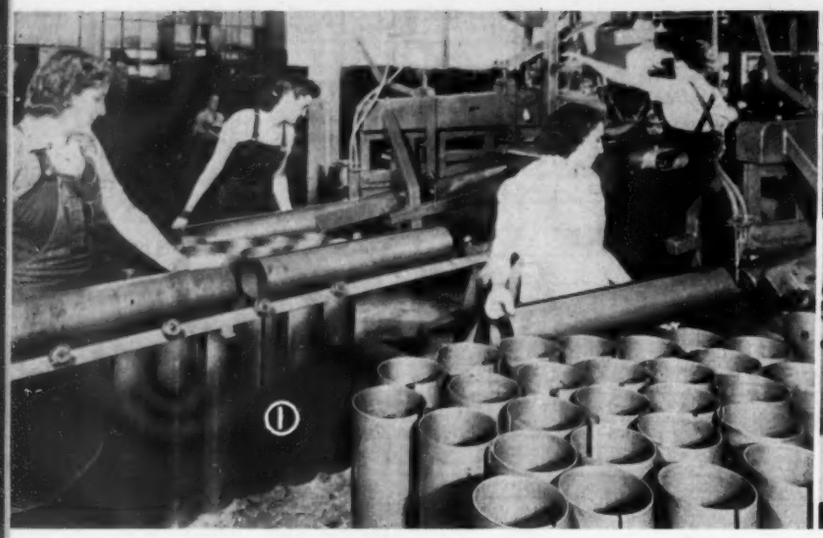
	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$9,377	$11,756	$10,964	$9,581
Federal Gross Debt (billions)	$234.9	$234.4	$233.9	$187.4
Bond Volume, NYSE (millions)	$56.1	$48.0	$41.9	$61.1
Stocks Sales, NYSE (thousands)	8,939	7,311	8,546	4,047
Loans and Investments (millions)†	$58.6	$58.9	$59.6	$53.3
United States Gov't. Obligations Held (millions)†	$44,105	$44,061	$44,554	$38,755

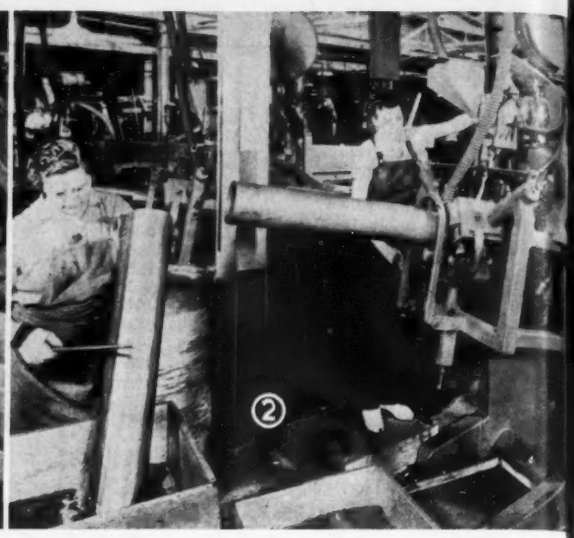
†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$57.55	$57.55	$57.55	$56.73
All Commodities†	104.8	105.0	104.7	103.6
Industrial Raw Materials†	115.7	116.2	115.3	113.7
Manufactured Products†	101.6	101.6	101.6	100.6

†Bureau of Labor's Index, 1926 = 100.





Welding LIGHT-GAGE

ONE of the greatest current contributions to the welding industry may prove to be the new continuous arc time welding fixtures for welding light gage metals in short lengths and in various shapes.

The fixtures are termed continuous arc time for the reason that if the travel speed is set at 300 inches per minute the yield of production footage per hour will be 1500 feet. These fixtures have made possible welding speeds never before thought possible by the methods employed and on considerably lighter gages than heretofore used.

Welding cost consists of two principal items, namely, labor and materials. Labor is usually the largest item as much time is consumed in placing the material to be welded in the fixture or holding device and only a small amount of time devoted to the actual welding. Maximum labor efficiency may therefore only be obtained when the welding time is 100 per cent of the labor involved or the arc time is continuous. The fixtures described here closely achieve this condition.

In order to keep pace with the demands of the armament program, a need was created for fixtures of this type and increased welding speed. The accomplishment of these objectives has been partially achieved, but there are still answers that have not yet reached the end point. Current densities have been imposed on ⅛-inch wire of over 1000 amperes and welding speeds on 14 and 16 gage of over 319 inches a minute, with submerged melt processes by the use of these fixtures.

The fixtures are basically not new but represent improvements in old machines and new combinations of old mechanical principles. The fixtures are designed on the movement of formed sections under an arc, where they are held in contour. A water cooled back-up shoe rides the inside of the section under the welding zone and the deposited metal bridges from one section to the next. Guide bars hold the sections in line under the arc. One operator feeds the sections in the back of the machine and one removes them from the front. These operations are shown in Figs. 1 and 2 as performed in the plant of the Standard Products Co., Port Clinton, O. Approximately 30 machines of the type described are in use on items such as shell containers, tent pole joints, invasion tubing, and containers of various diameters and lengths. The fixtures may be used on round, oval, square or other shapes shown

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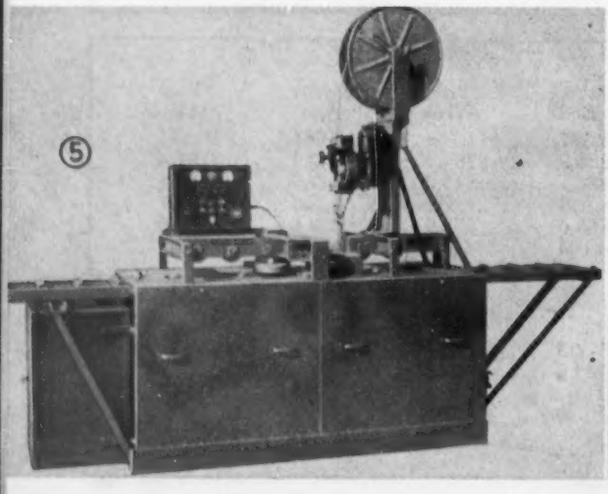

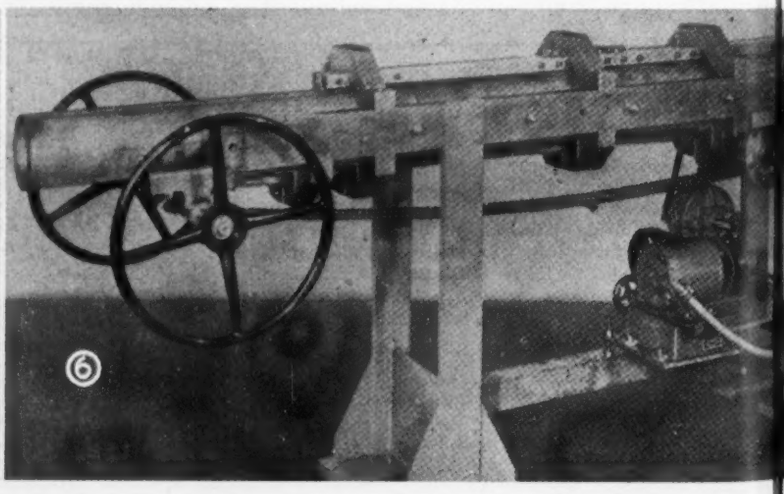

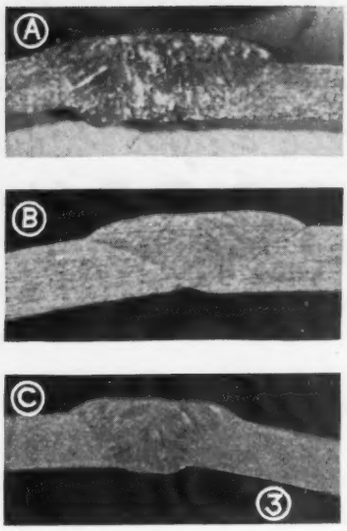

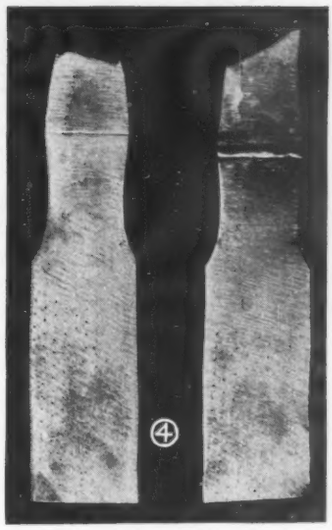

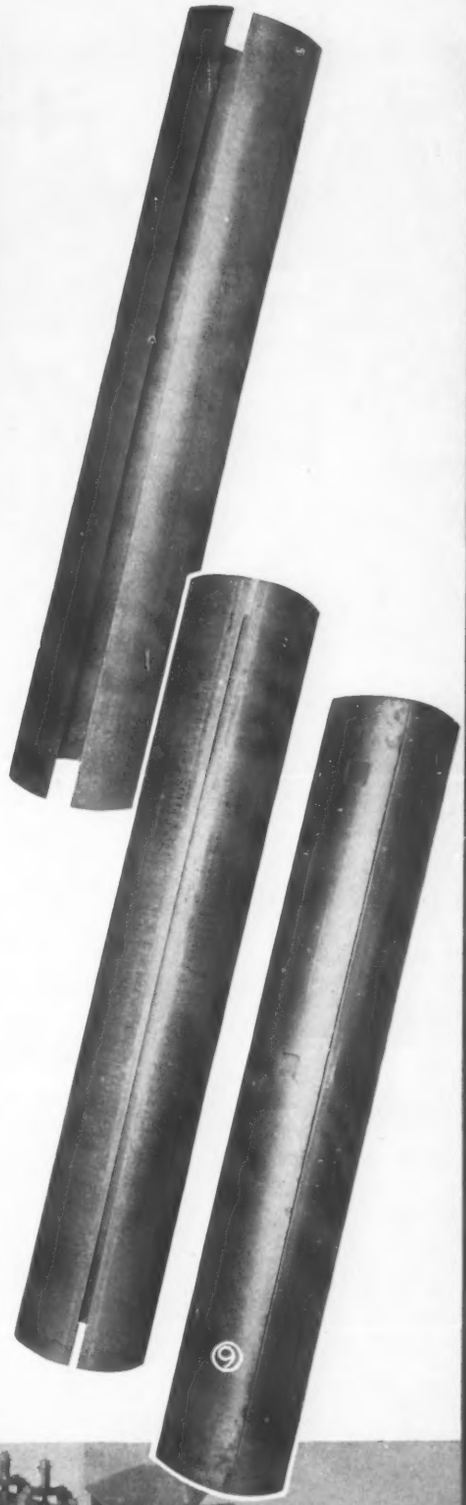

By R. V. ANDERSON
Chief Welding Engineer
Rheem Mfg. Co.
Sparrows Point, Md.

ESTEEL

at high speed by submerged arc process facilitated by new developments in fixtures

shapes. Various types of fixtures are shown in Figs. 5, 6, 7 and 8.

As welding speeds are increased there is a drop in the cost of materials per foot of weld. The weld bead narrows, the arc is more directional and the weld is made with less filler metal and more of the parent metal of the section being welded. Weld beads may be made almost flush with complete penetration and have physical qualities much better than the parent metal.

Fig. 3 shows welds made on 14 gage material at (A) 100, (B) 200, and (C) 300 inches per minute and illustrates the narrowing of the weld bead as speed is increased and the arc becomes more directional. The steel used has an ultimate strength of about 48,000 pounds per square inch while the deposited metal has an ultimate averaging from 60,000 to 70,000 pounds per square inch. Specimens prepared with 70 per cent penetration seem to be stronger than the parent metal. This is shown in Fig. 4.

The welding speeds obtained are dependent on forming cleanliness, fit up, gear ratio, controls, flux or melt, and the current imposed. The sections should be formed as nearly perfect as possible and all the sections passing through the fixture should have the same forming. In the case of cylinders the welding edges should have the same radius as the rest of the body.

Preparation for welding is illustrated in Fig. 9. The sections on the left are not entirely desirable while the one on the right will yield excellent results. Some fixtures notch the welding edges which increases the welding speed ob-

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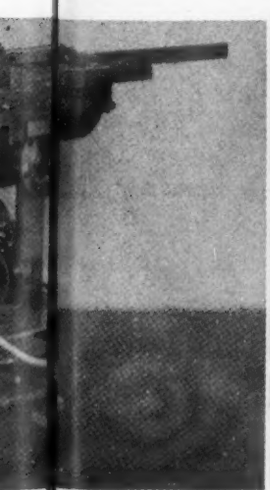
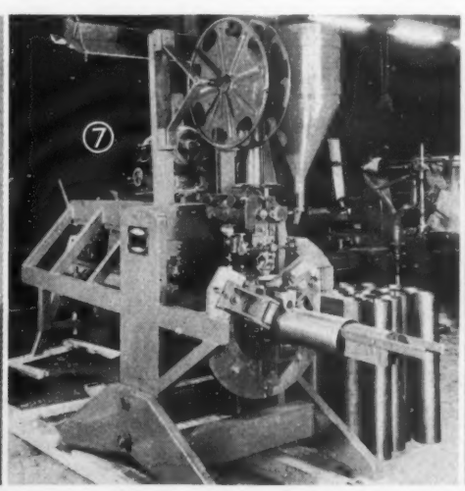
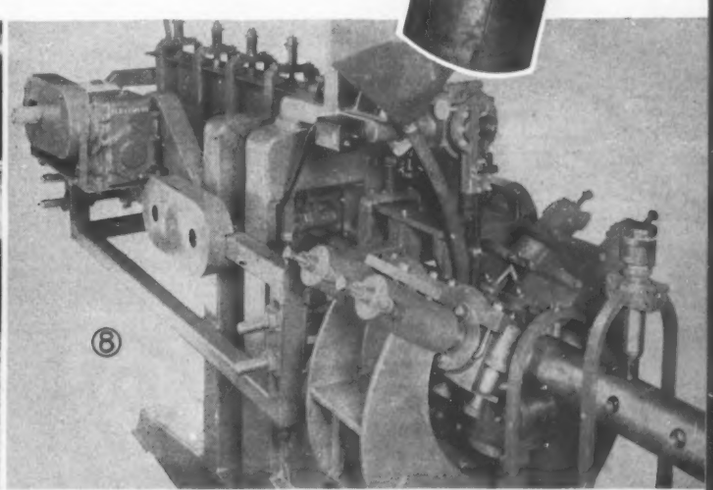
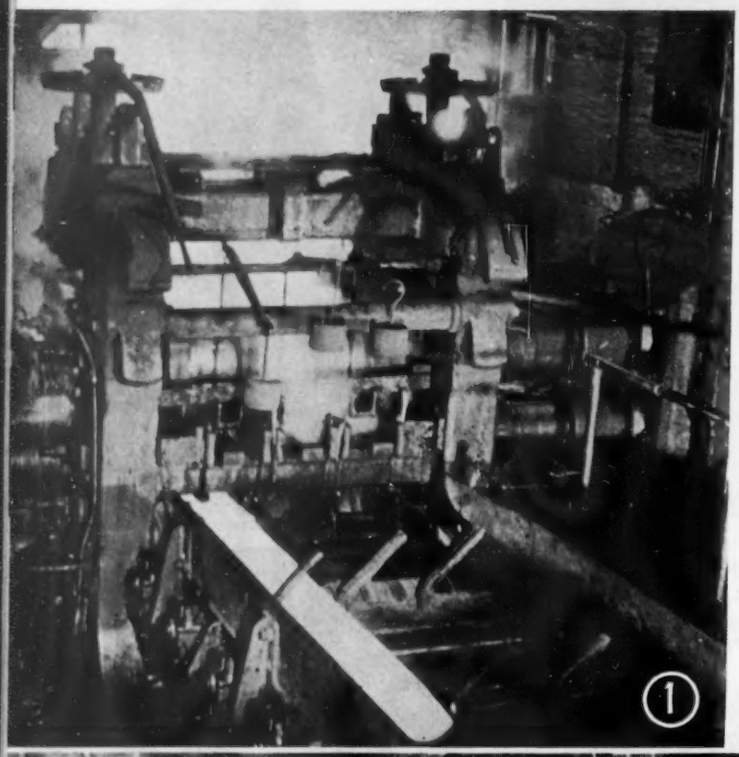






Electric Arc Hot Tops Reduce Ingot Losses in PRODUCING

Lime glass maintained in molten state on top of ingot for about 12 minutes minimizes croppage in International Nickel Co. plant. First mills of cluster type built in this country to roll wide sheets are still in service. Extrusion press of 4000-ton capacity makes possible the extrusion of high-nickel alloys. Manufacture of Monel metal is described in detail



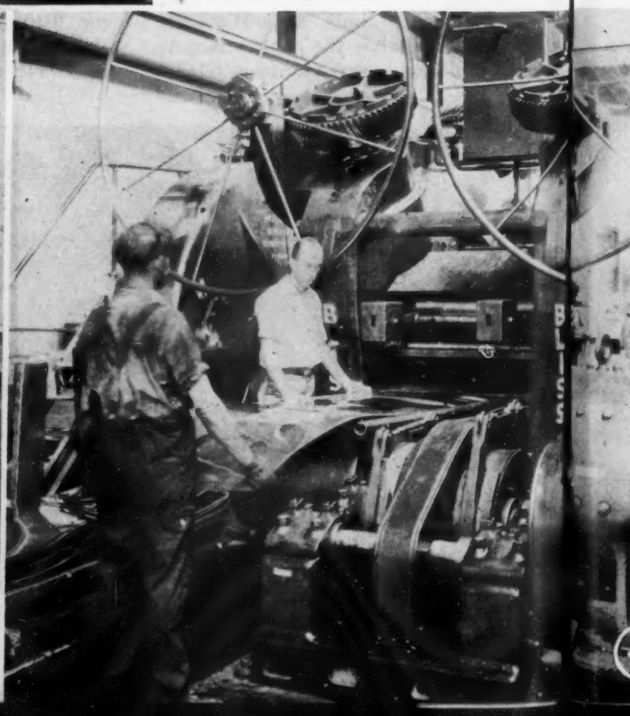


Fig. 1 — Rolling Monel blooms into sheet bars on 24-inch merchant mill

Fig. 2 — Transferring a breakdown sheet from the sheet furnace to the 2-high finishing mill

Fig. 3 — Tapping heat of nickel from an open hearth

Fig. 4—First large cluster mill to be operated in the United States. This mill is still in service rolling Monel sheets

Fig. 5—Applying electric arc hot tops to molten Monel ingots

By JOHN D. KNOX
Steel Plant Editor, STEEL

HIGH NICKEL ALLOYS

BACK in the middle twenties two men were engaged in conversation in the lobby of a prominent New York hotel—one was the president of a large New England fabricating company and the other a well-known rolling mill engineer. The fabricator sought engineering advice concerning the revamping of his plant; the engineer agreed to assist him. The following day found them seated in the executive's office.

"Your rearrangement of the machinery on the ground floor is logical," the president stated, "but to remove the wooden pillars to provide room for the suggested layout is utterly impossible. How would you support the machinery located on the floor above?" The engineer was taken by surprise for, when making his original survey of shop conditions, he had been told by one of the foremen to disregard the equipment on the second floor; but now faced with a question concerning the disposition of "overhead weight," he returned to the shop to have a look at the "upstairs machinery." What he saw forms one of those interesting stories in rolling mill technology.

In a good sized room on the floor above were many rows of benches, and on these, anchored to shoes, were miniature rolling mills turning out flat wire with close tolerances. Upon closer observation he found six rolls mounted in the housings of each mill—two work rolls in a vertical plane, each backed up with a pair of larger diameter rolls—six in all. The mills were made in Switzerland. Because of the arrangement of the rolls, the engineer added a new word to American rolling mill parlance—Cluster mill. But the story does not end here.

The engineer, recognizing the importance of this type mill, shortly thereafter secured the American patent rights. About this time the International Nickel Co. was looking around for a mill that would exert sufficient pressure to cold roll its Monel metal to uniform gage across the width of the sheet. The cluster mill appeared to meet all the specifications, and when one came off the drafting board it was with roll dimensions of 12 and 24 x 42 inches—no longer in the miniature.

The mill was installed in 1926 at the Huntington, W. Va., works of the International Nickel Co. and was the first mill of its type to go in operation in this country. About this time sheetmakers in the steel industry became vitally interested in equipment for cold rolling stripsheets and, through the courtesy of the International Nickel Co., many trial runs were made on this first cluster mill by well-known steel companies. As a result several cluster mills were built for cold rolling steel sheets under heavy reduction, and a number of these still are in service. In fact, one pass through the cluster-type mill is equivalent to 84 passes through the conventional 2-high cold mill.

So successful was this mill at International's plant that the company ordered a second unit. Both cluster mills still are in operation cold rolling Monel.

The foregoing account undoubtedly comes to the mind of many engineers and steel plant operators by the mention of "cluster mill" because of its contribution to the early development in cold rolling stripsheets in wide widths under heavy reduction.

The cluster mill is not the only "first" in the list of things credited to the Huntington works of the International Nickel Co., for in this plant have originated such items as an oil lubricating system, use of block tin in mill bearings, a method of strip annealing, the repeater for 2-high cold mills, application of bearings on pinions for driving top and bottom rolls of 2-high mills, the sheet polishing machine, the introduction of electric furnace in the nonferrous alloy field, and the first improved tube reducing mill.

The plant is located on the outskirts of Huntington, W. Va., within the radius of 50 miles of which are to be found brick and glass manufacturing plants, rolling mills, coal, a $60,000,000 armament plant and a $40,000,000 gun shop. Three railroads serve the area. About

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SUPERIMPOSED

By G. W. BIRDSALL
Associate Editor, STEEL

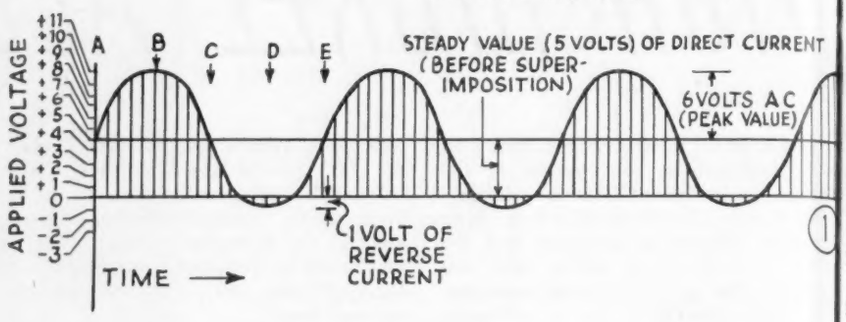

Fig. 1 — Diagram to show effect of superimposing a 6-volt (peak value) alternating current on a 5-volt direct current. Note that effective current is reversed for that portion of the cycle when wave dips below zero line. The effective plating current is indicated by the shaded portion

Fig. 2—Oscillograph employs cathode ray tube to visualize wave forms, enabling best wave form for plating to be selected

EAC on DC

. . . . permits plating outputs to be doubled or tripled when used with newly developed metallo-organic solution additions; also affords improved covering power in recesses and a uniformly greater brilliance; thus makes available new levels of performance and economy in electro-deposition of zinc, cadmium and copper

A NEW process for electroplating zinc on steel gives such excellent performance that it already has been widely adopted, some 205 plants now employing more than 400,000 amperes of connected capacity.

The process is the result of work by Dr. A. E. Chester, Research Director, and other members of his staff at Promat Division, Poor & Company, Waukegan, Ill. The Promat Division was organized to help improve protective finishes for the railroad industry. One of the early results of such work was Porcenell —a one-coat porcelain or ceramic finish with the important advantage of being thinner and tougher than conventional porcelain enamel finishes; also it requires no special enameling steel for the base, being suitable for application on ordinary sheet; since it is applied at a lower temperature, it also permits use of thinner stock.

Fig. 3—Typical parts on which Promat processes prove advantageous. Tire rim at right involves putting good deposit of zinc on depressed rim center without putting too much on the sharp edges; sheet steel chassis in rim and at left require uniform coating of 0.0005-inch zinc on inside as well as outside surfaces; cast iron wheel in center is plated in Promat cyanide zinc bath; small couplings well illustrate excellent throwing power

Fig. 4 — Laboratory section handling initial work on new plating processes, with complete facilities for working small samples in two jars under carefully controlled conditions

Fig. 5—General view of Promat control and development laboratory at Waukegan

Promat Zinc Process: Under the impetus of war demands for higher standards of quality and faster production, an entirely new process of electroplating zinc on steel was developed, reports J. S. Hicok of Promat in a recent interview at the Waukegan plant. It has proved extremely successful in treating innumerable plated materials for the Army, Navy and Air Corps. Zinc is one of the best protective materials for steel because of its favorable electrochemical reaction under corrosive conditions, an extremely thin layer of zinc affording excellent protection against corrosion.

Similar processes for plating cadmium and copper have been developed and processes for depositing tin, brass and other materials now are being investigated.

Mr. Hicok explains that the Promat process departs from conventional plating methods in two ways.

Special Additions: An important feature of the new processes is the use of recently developed metallo-organic compounds. In all Promat processes, regardless of whether the solution is of the acid, neutral or alkaline types, the metal to be deposited is also present in the form of complex ions of these newly developed metallo-organic compounds.

When depositing zinc with cyanide baths, these additions to conventional electrolytes make available zinc in a new and highly platable form. The result is unusually efficient plating action, even with conventional direct-current power sources.

Superimposed A C on D C: Perhaps the most significant departure from conventional practice is the use of alternating current superimposed on the usual direct current employed in electroplating. While the use of superimposed alternating current has been studied by electrochemists for years and has been quite widely employed in electrochemical manufacturing operations and in electrowinning, it has had only very limited application to the electrodeposition of metals.

One of the chief difficulties in connecting alternating current and direct current power sources in series is the problem of preventing the heavy direct current from saturating the core of the transformer from which the alternating current is obtained.

However, Mr. Hicok reports development of a method which allows the full direct-current load of the generator or rectifier to be passed through the secondary of the transformer without causing distortion of the wave form. A sinusoidal wave with a valley value adjustable with respect to the zero axis is obtained.

Another method of securing alternating current imposition feeds the alternating current into the plating bath through specially designed anodes and a unique circuit that prevents feedback effects between the alternating current and direct-current systems.

Significance of Superimposition: Regardless of the method of superimposing, the effect of a superimposed alternating current of the correct voltage is to greatly increase plating efficiency and to improve crystal structure. This results from the following effects:

Usually just enough alternating current voltage is applied so that the effective plating current is reversed for but a small fraction of every cycle. Fig. 1 shows a typical set of curves and voltage values for such work. Here an alternating current of 6 volts (peak value, not root-mean-square value) is superimposed upon a steady direct current of 5 volts. Resulting voltage applied to the electrodes (shown by curve and shaded area) varies from approximately 11 volts in one direction to approximately 1 volt in the opposite direction. Thus for that small portion of the cycle during which the voltage curve dips below the zero line, the plating current is reversed.

For proper operation, the exact amount of reverse current and time it is applied must be controlled accurately. Lack of full realization of this point has resulted in unsatisfactory operation at some installations until the condition was cor-

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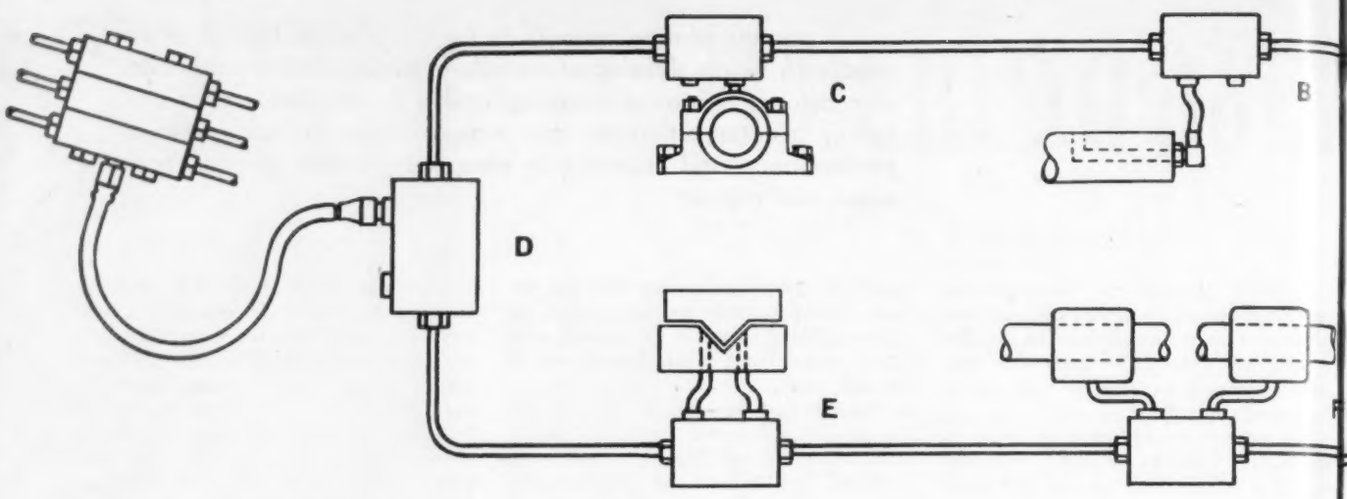
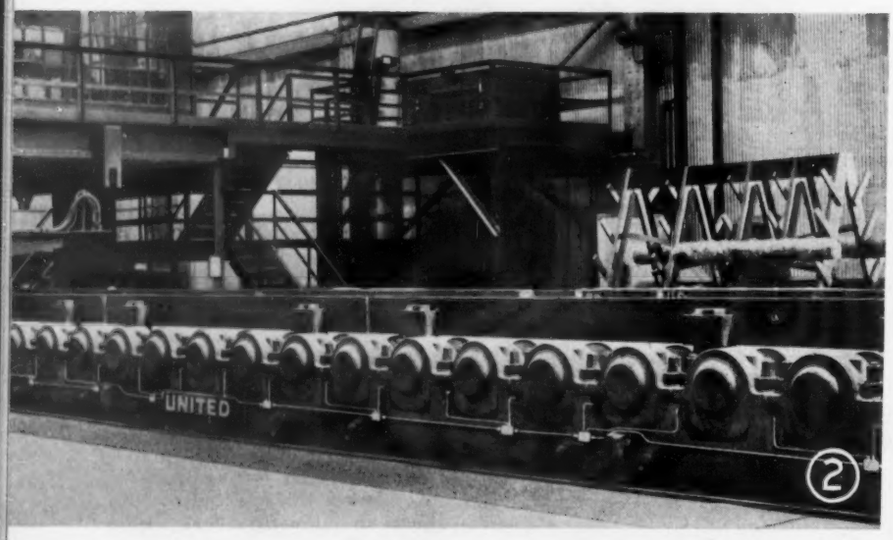
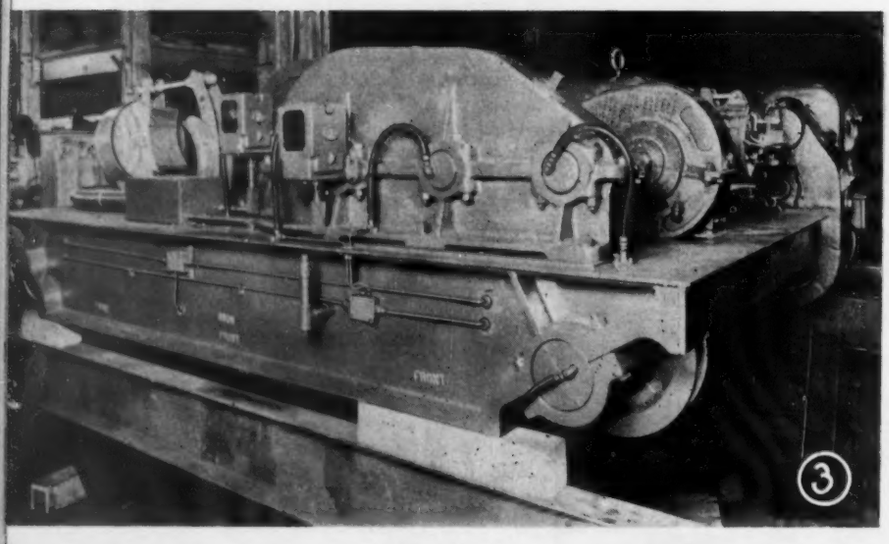


POSITIVE AUTOMATIC





DURING this year, and also the years ahead, the experts are agreed—American industry will need to seek out and employ fully the most efficient, and most improved manufacturing aids that science has devised.

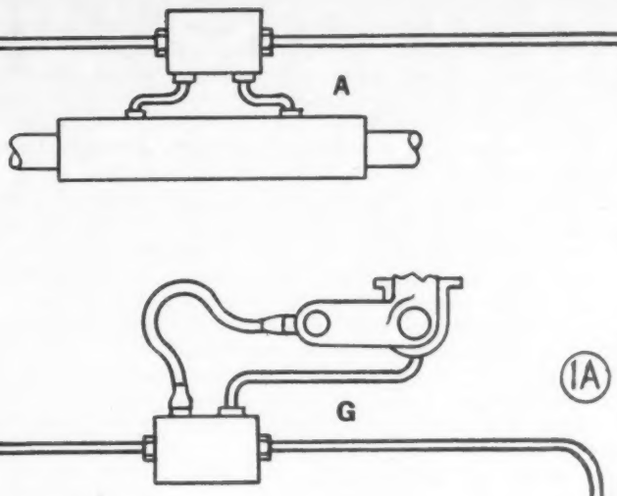
Now and probably for the rest of this year, all attention is focused on maximum production to bring the war to a speedy and successful conclusion. This requires efficient use of all men now in war industries not taken by the draft, and the new men being shifted from less essential industries into the war industries under threat of the proposed "work or fight" legislation. Especially this latter group—uprooted from their established businesses, sometimes at quite great sacrifices, will demand that they be employed at greatest possible efficiency—at productive work, not just maintenance and upkeep jobs.

And in the years that follow—after the war—industry will not only have the problem of providing peace time jobs for 10,000,000 returned service men and uncounted millions of former war workers —60,000,000 jobs in all it is said—but of doing this, while competing in our own and foreign markets with the cheap labor of European and South American countries.

To this undertaking, according to latest reports from Washington, has now been added the postwar requirement of maintaining the workers "take home" pay at

Fig. 2 — Multiple bearings on steel mill runout table are served by automatic system

Fig. 3 — Automatic lubrication equipment applied to this crane trolley provides a safeguard against possible bearing trouble



(1A)

LUBRICATION

By R. L. HARTER
Chief Engineer
Trabon Engineering Corp.
Cleveland

Both over and under lubrication are avoided, bearing failures prevented and important economies obtained through use of lubricating systems which synchronize rate of supply with rate of consumption

wartime levels, although they will be working only a 40-hour peacetime week. This means, that this fight for survival against foreign competition must be waged—and won—while paying peacetime rates that an administrative spokesman estimates may range up to 30 per cent higher than present wartime rates.

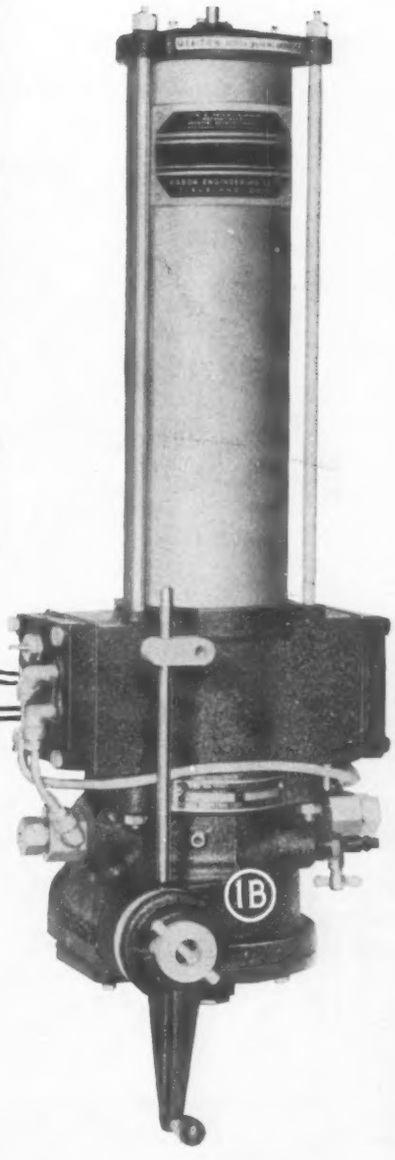
Obviously, this paradox of lowest possible selling prices on the one hand and 30 per cent higher than war time wage rates on the other requires the elimination of all waste. Each worker must be employed effectively and efficiently. Industry—to survive—must get along with a minimum of maintenance workers, oilers, sweepers, etc.

It means a widening and expansion of the trend already evidenced to employ as fully as possible the efficiencies offered by the newest and latest advances in machine lubrication, because—like machine design, plant layout, and other manufacturing techniques, lubrication too has gone through various and distinct stages of development. These include:—

Hand Lubrication: This earliest method of lubricating machinery employed oil holes, grease cups, and later pressure fittings and hand guns. It requires that the machine be shut down while it is lubricated, resulting in substantial losses in production while a man crawls around lubricating each bearing individually. Personal risk is great, resulting in accident and injuries especially when lubricating large machinery, overhead traveling cranes, etc.

Although still employed in certain plants, hand lubrication usually means that the conveniently located easy-to-reach bearings are "flooded," wasting lubricant. Hard-to-reach bearings are frequently overlooked, resulting in bearing failures and machine breakdowns—extremely costly from the standpoint of new parts, the labor in making repairs, and lost production while the machine is out of service.

Centralized Lubrication: Although sometimes referred to as "the latest" development, this is really only the second step in the development of lubricating science. In fact, Trabon Engineering Corp. installed "centralized" systems in a large steel plant in Pennsylvania nearly fifteen years ago. One of



(1B)

Fig. 1—Schematic diagram of typical Trabon automatic positive lubrication system serving: A—two points on long sleeve bearing; B—uses flexible hose and swivel to serve a bearing through a revolving shaft; C—anti-friction pillow block; D—six bearings on moving member of machine served through section of rubber hose and separate feeder; E—machine gib and way; F—two sleeve bearings; G—tubing and hose serve fixed and moving points on linkage

the earliest centralized systems consisted of lines running from bearings to some easily accessible "centralized" point, so that all the bearings could be "shot" —one after another—by a man standing on the floor. This relieved the oiler of the need of climbing around the machine and frequently permitted the machine to be lubricated while it was in operation.

In practice, however, the oiler usually *over* lubricated the bearings to assure *adequate* lubrication. The sides of the machines were coated with excess lubricant, resulting in high grease bills, and —in the case of ball and roller types— the bearings were packed so full of lubricant as to resist, instead of aid, the transmission of power, thus increasing the power load.

The next step in "centralized" lubrication was the introduction of measuring, or metering, devices called "feeders." These were mounted on the machine at convenient places. Lines were run from the feeders to the bearings, and the feeders were connected together into a circuit. Lubricant was then introduced into the system from some easily accessible point with a grease gun, grease pack or barrel pump, etc., and the feeders made absolutely certain that the proper, exactly desired, amount of lubricant was delivered to each bearing. Sometimes a hand pump was installed, so that the oiler went his rounds from one machine to another operating the pump machine to another operating required number of times.

But even this hand system leaned heavily on the human factor. If an oiler came around too often the bearings got too much grease. If he came around too infrequently the bearings got too little grease. Though an improvement over oil hole and grease cup lubrication, the centralized system served principally as a transition step between *hand,* and the now widely used *automatic* lubrication.

Automatic Lubrication: The third, and latest development of lubricating science—*making possible the many savings and economies that will be described* —employs the measuring feeders of the centralized system. But it introduces the lubricant into the system with a pump having known discharge capacity, driven either by a separate electric motor, or by an over-running clutch or other suitable drive from a moving part of the machine being lubricated. See diagram Fig. 1.

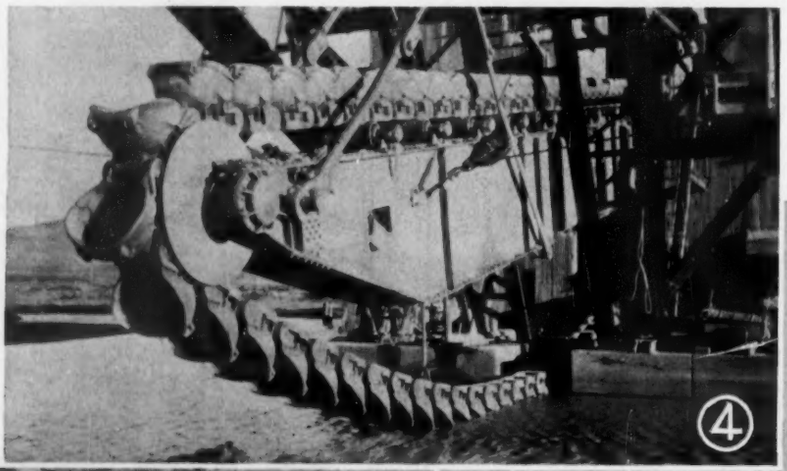
As lubricant is pumped through the circuit under pressure, it operates the metering piston in the first feeder in the circuit, discharging an exact, measured amount of lubricant to the bearing connected to that feeder. The operation of the metering piston exposes a port in the feeder, permitting lubricant to continue on to the next feeder in the circuit, and dischârge a measured, and metered (but not necessarily the same) amount of lubricant to that bearing, and then continue on to the next feeder, and the next, one after another and back to the pump reservoir. The oncoming lubricant operates a visual indicator located at the pump, where it can be easily seen, or an electric light signal that may be placed in a near or distant office, giving positive visual assurance that the circuit has been completed.

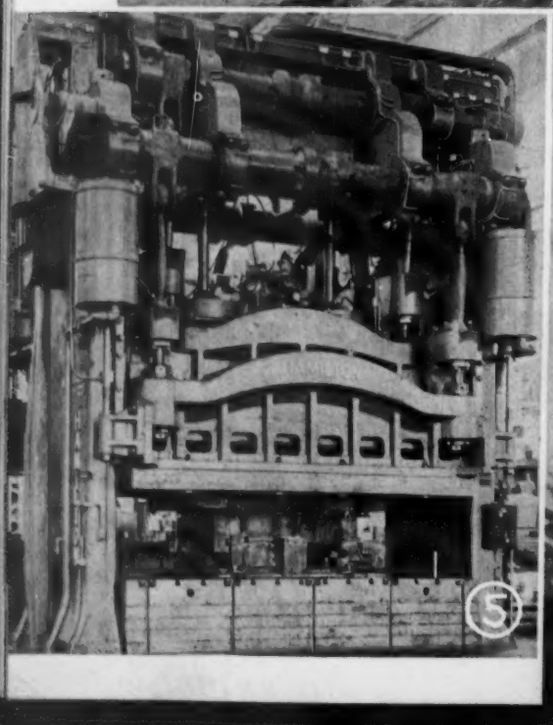
The direction of lubricant flow is then reversed automatically, and the lubricant is pumped through the circuit in reverse direction, operating one feeder after another in succession, and back to the reservoir, operating the indicator or

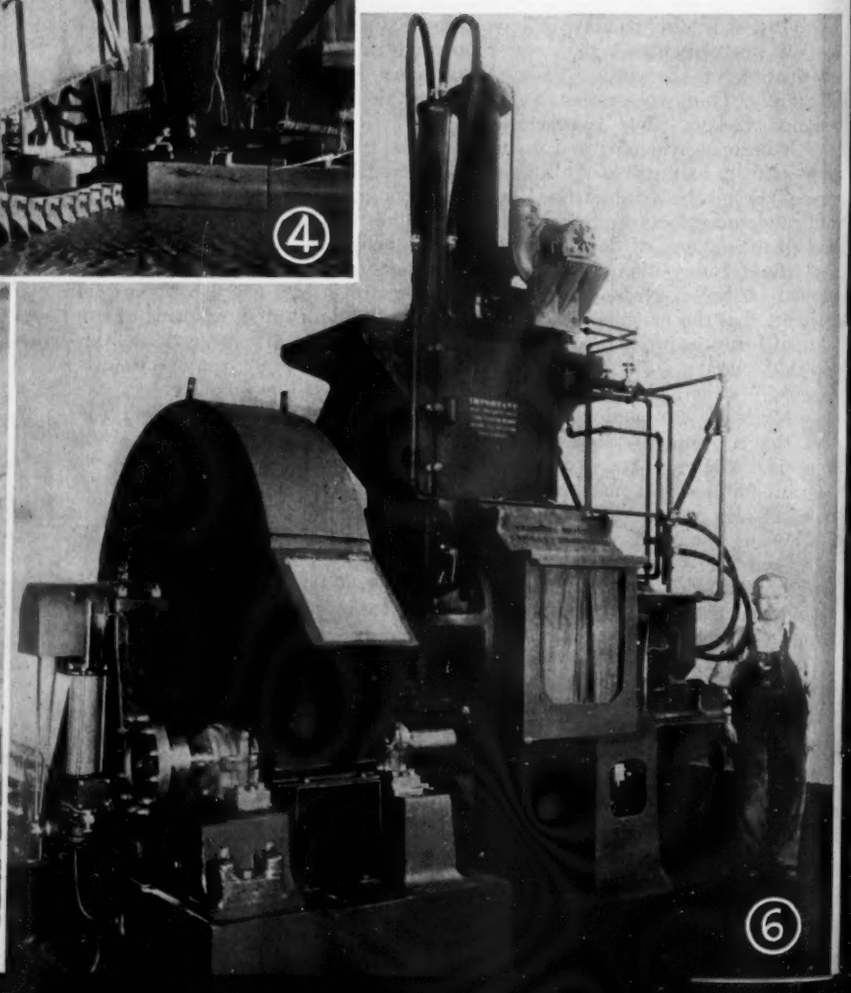
Fig. 4—Bearings of dredge ladder work under water, are automatically lubricated. Importance of proper lubrication can not be underestimated here

Fig. 5—Large automobile body press has installations of numerous feeders seen around top portion, all connected to lubricator to form automatic system

Fig. 6—Banbury mixer has automatic lubricator driven from shaft at the extreme left







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light, to show that the circuit has again been completed.

Feeders are available in various sizes, capable of discharging from 0.005 to 2 cubic inches per stroke. In addition, the two outlets of one feeder, or all the outlets of several feeders, can be manifolded together to meet any requirement in lubricating even the very largest bearings.

Automatic lubrication such as described above offers many advantages, including the following:

A Single Line of Piping Only: This means that there are few connections to make, minimizing installation time and cost.

Low Pressure Operation: The system is operated entirely by the flow of lubricant through the circuit. Although ample pressure is available to lubricate the tightest bearings, the system needs only enough pressure to overcome the resistance of the line, and the individual bearing being lubricated.

Fully Enclosed Construction: There are no exposed moving, outside parts to corrode, get bent, or cause leakage.

No Springs: Nor are there any check valves, levers or packing. Consequently, the feeders are free operating under all service and temperature conditions, even when exposed to the corrosive gases on revolving blast furnace tops.

Positive Operation: Due to the design, each feeder must discharge to its connected bearing *first*, in order to open the port that permits lubricant to flow on to the next feeder in the circuit. Consequently, with a Trabon automatic system, lubricant *positively cannot pass* any bearing by without lubricating it, and go on to lubricate the next bearing.

Easy Visual Check: Use of a single indicator placed at the pump, where it can be easily seen by the operator, or an electric light located in a nearby or distant office, gives positive assurance that the entire system is operating properly. Consequently, the feeders can be located in the most advantageous position on the machine, even though they be hidden from view.

Short Timing Cycle: With a hand, or even hand operated centralized system, the bearings were lubricated, as we have seen, by a man making the rounds every 2, 4 or even every 8 hours. The amount of lubricant in the bearings varied greatly. First perhaps the bearings were full to overflowing. Then the supply may have worked down almost to the danger point, followed by the bearings being again filled to overflowing. With Trabon automatic lubrication, smaller amounts of lubricant are supplied to the bearings almost continuously, i.e., every 10, 15 or 20 minutes if desired, thus maintaining a practically constant amount of lubricant in each bearing. The experts all agree that this results in much improved operation.

Cuts Lubricating Costs: With manual operation the usual practice is to "over lubricate" so as to assure sufficient lubrication. Trabon automatic lubrication avoids over lubrication. The waste, and unsightly appearance of grease running down the side of the machine is avoided, resulting in savings of 50 per cent, sometimes even 75 per cent in the amounts —and cost—of lubricant required.

Much Reduced Power Consumption: Because the shafts are always turning in the exactly desired amount of lubricant, substantial savings are made in power consumption as compared to manual methods, where the bearings are first flooded, then nearly dry, then flooded again. In the case of ball and roller type bearings, this may set up internal friction, that causes as much harm to the bearings (and added power load) as "under lubrication."

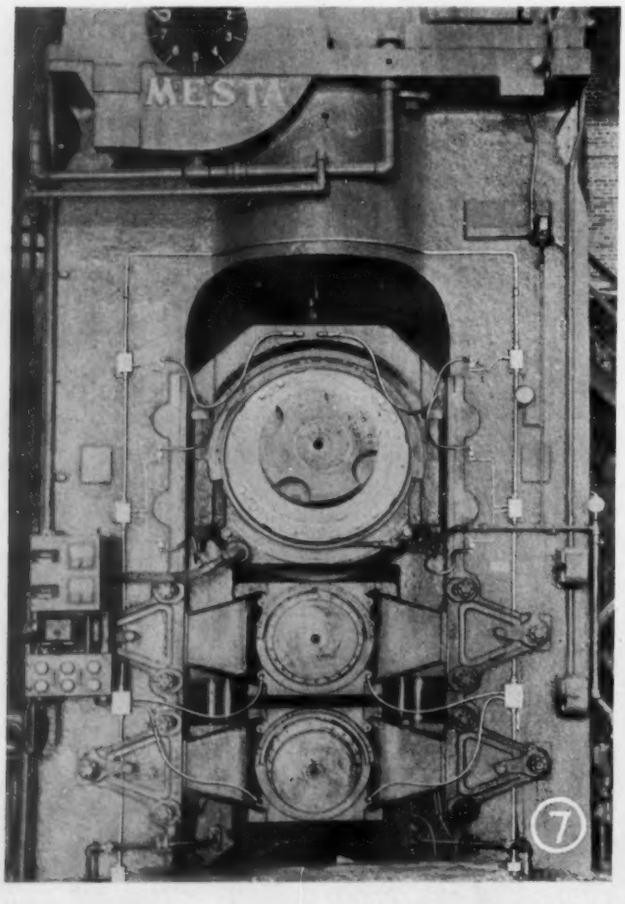
Minimized Bearing Failures: Records on job after job show that automatic

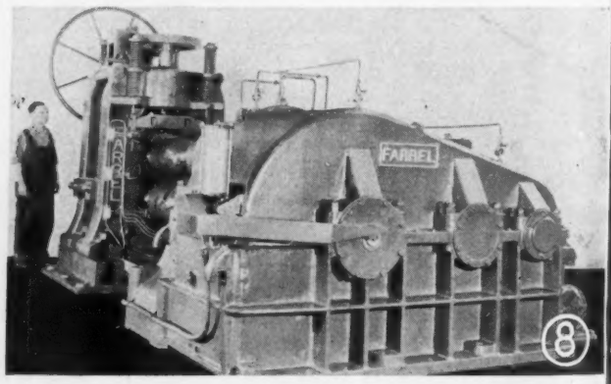
(*Please turn to Page* 152)

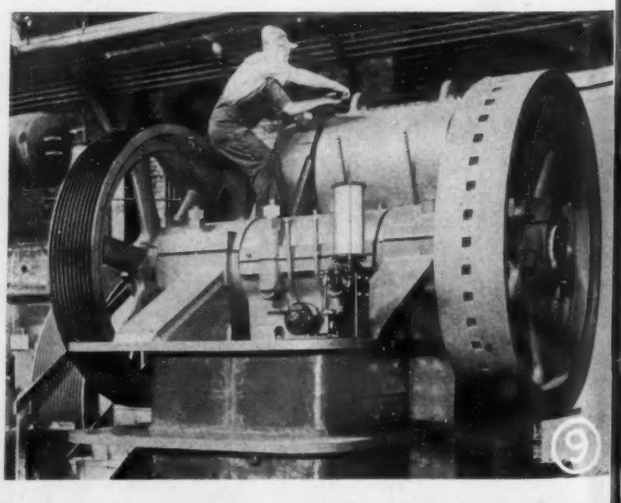
Fig. 7—This 4-high stand for a steel mill features flexible connections to serve the adjustable roll bearings from automatic system piping mounted on the machine frame

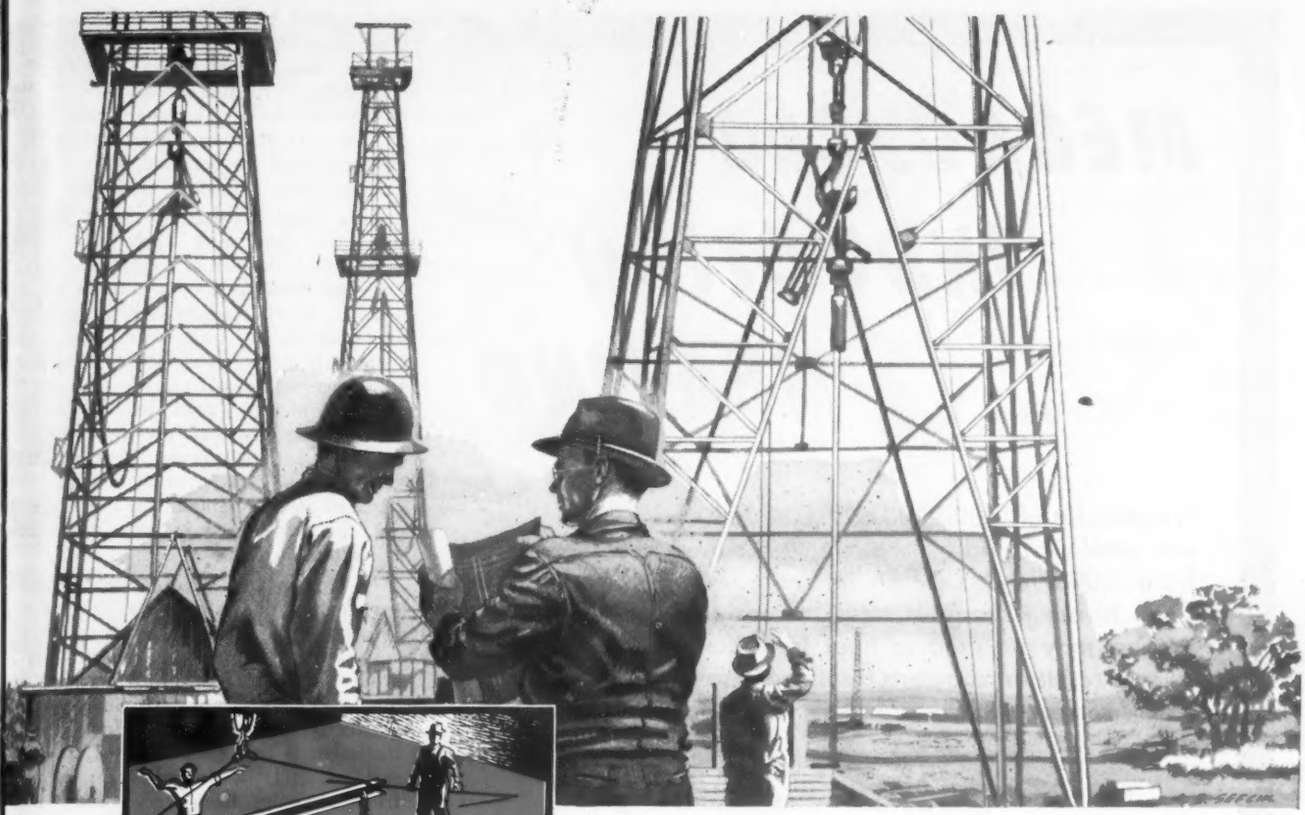
Fig. 8—All bearings of this mill for cold rolling alloys are lubricated automatically by the system

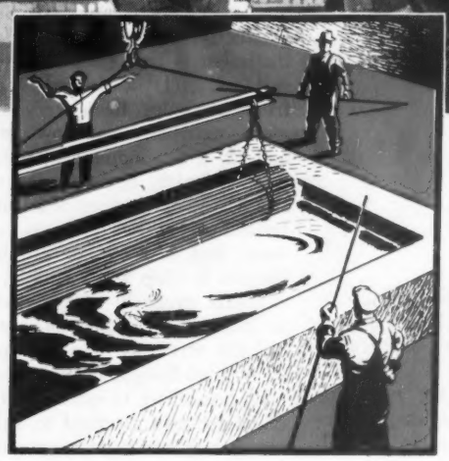
Fig. 9—Just below workman is automatic motor-driven lubricator for this 42 x 30-*inch jaw crusher*











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By VERNON W. SHERMAN
Manager
Industrial Electronics Division
Federal Telephone & Radio Corp.
Newark, N. J.

USE OF induction heat for the treatment of metals dates back to well before the turn of the century. A number of patents had been issued in the late 1800's both abroad and in the United States for the processes and apparatus employing high frequency electric energy as the heating agent. Edward A. Colby called attention to the fact that for conducting metals, the furnace charge could be used as the entire secondary circuit. In 1898, Nikola Tesla described the use of Hertzian waves for induction heating.

Induction heating took an important step in a new direction in 1925, so far as apparatus, frequency range and versatility are concerned: Vacuum tubes were used as the energy source for high frequency heating equipment. Considered experimental when it first appeared, vacuum tube heating of metals started to come into its own about ten years ago. Since 1940, acceptance of vacuum tube induction heating accelerated rapidly, and new applications were developed at such a rapid pace that today induction heating ranks as an accepted procedure of the metal industries.

Since the fundamental requirement of induction heating is alternating current, such heating can be accomplished with any frequency from the commercial 60 cycles up to millions of cycles per second. There are three recognized types of induction heating equipment and there is a direct relation between the type of equipment, its practical frequency range, and the heating job it is best suited to perform. For the purpose of a brief review we can recognize the following:

First, motor generators are used for frequencies up to 12,000 cycles per second. These are well adapted to through heating or deep heating of ferro magnetic materials. This equipment is available up to thousands of kilowatts in output. Common sizes range up to 1200 kilowatts. The overall efficiency of the entire equipment is usually between 50 and 60 per cent while the efficiency of the frequency changer sets range from 80 to 90 per cent.

Secondly, there are spark gap units for frequencies between 20,000 and 300,000 cycles per second. These are suitable for general heat treatment such as melting, deep surface hardening and general purpose brazing. The power input of spark-gap equipment commonly ranges up to about 35 kilowatts. The output varies widely, depending upon the type of load, the method of coupling and the condition of the spark gap. Under good conditions 50 per cent efficiency may be realized whereas under poor conditions it may hardly exceed 15 per cent.

The third and newest type of induction heating unit is the vacuum tube unit adaptable to frequencies from 350 kilocycles up to over 100,000,000 cycles per second. For induction heating purposes, frequencies between 350,000 cycles and 15,000,000 cycles are widely used. The power output of vacuum tube units reaches hundreds of kilowatts and common size range from 5 to 50-kilowatt output with the emphasis on 25 and 40-kilowatt sizes. The overall efficiency of vacuum tube equipment ranges between 50 and 60 per cent with a reliable operating efficiency of 50 per cent.

Thin Case Hardening: This discussion is concerned primarily with thin case hardening and is therefore restricted to the two types of induction heating units which produce relatively high frequencies, i.e., the spark gap unit and the vacuum tube unit. Reference will also be made to the sub-zero treatment of steel, but as data regarding the physical metallurgical implications of this method are very limited because little research into this phase of steel treatment has been carried out, this paper can do little more than call attention to it.

It is generally agreed that sub-zero treatment of tool steel does increase the productive life of the steel. One investigator, for example, reporting on a group of high-speed steels, claims an average increase of 40 per cent in productivity attributable to sub-zero treatment. This phenomenon is the result of: (1) a forced transformation from austenite to a very nearly complete martensite at low temperatures; and (2) a predominantly mottled, rather than acicular, structure of the martensite. Not only does this latter characteristic increase hardness and reduce wear, but it holds to a minimum tendencies to chip and crumble.

Steels properly normalized or treated so that they possess a preponderantly sorbitic structure can in turn be heated by high frequency induction and properly quenched to produce the valuable characteristics ascribed to sub-zero treatments. It has been amply demonstrated that correct induction heating produces a fine, nodular type of martensite and not the acicular martensitic structure that usually results from furnace hardening. Here, in brief, are reproduced in but a few seconds by high frequency heating the outstanding advantages of sub-zero treatment in a manner more adaptable to mass production requirements. Added to this is an advantage which only high frequency induction heating is capable of rendering, namely a controlled case of any thickness desired.

The manifold characteristics of high frequency induction hardening have not yet been fully interpreted metallurgically. All latest investigations indicate that the new process is capable of producing what may be termed "new" structures, that is metal structures whose ultimate specific value to industry will be demonstrated as time goes on.

A simple heat treatment which would produce a thin layer of hardened surface of readily controllable depth and maximum hardness and tensile strength over a core of previously toughened steel without alteration of the core properties has long been regarded as a "me

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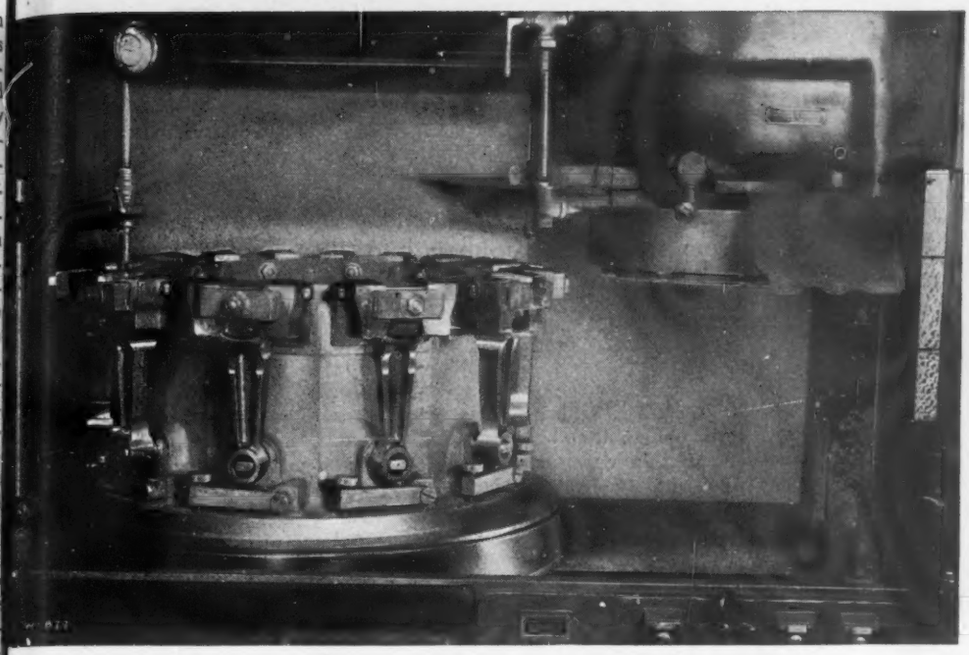

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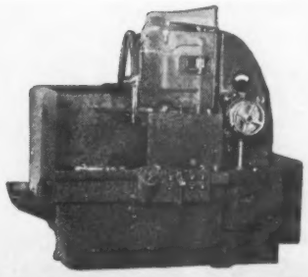

This job being done on the No. 18 Blanchard Surface Grinder

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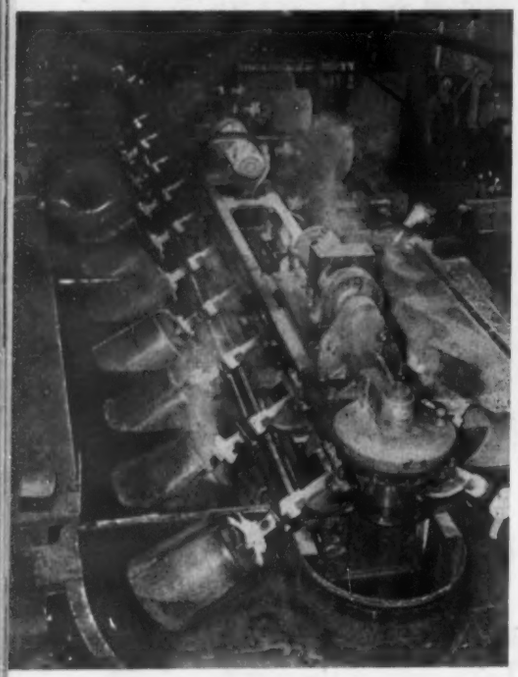
Automatic Dipping Setup



Millions of rivets and small aluminum alloy parts daily are given corrosion preventive treatment by Willow Run's "alrok" process, a combination of chemical reaction resulting in oxidized finish on parts and huge high-production unit of conveyor, baskets and dipping tanks all in one

GIANT automatic "alroking" machine at the Ford Willow Run bomber plant, shown in Fig. 1, daily coats several million rivets and small aluminum parts for the B-24 Liberator bomber. Called by workers "the methodical giant that never forgets," this unusual arrangement of conveyor machinery, baskets and dipping tanks was the only completely automatic dipping set-up of its kind when first placed in operation at Willow Run. To handle the 12 operations required, special mechanical equipment was designed by Ford engineers.

The "alrok" process (a pure chemical reaction resulting in the oxidation of aluminum alloy) is used for finishing small aluminum parts instead of anodizing (an electrochemical process), and it is well suited to use in a mass production program which reaches approximately one bomber per hour. Ford men say the alrok process requires less equipment and labor.

A large platform was set up on which 10 tanks were placed, as shown in accompanying illustrations. They are centered about the revolving oval screw-type conveyor on which are mounted 23 drum-like baskets, each with a capacity of nearly 60 pounds. Overall length of the dipping machine is 33 feet, and it not only revolves the baskets while they are in the tanks, but also raises them when moving to the next position. Each basket travels a distance of 66 feet in the circuit. The complete cycle is made in approximately 1 hour and 20 minutes.

Following loading of the basket with rivets, illustrated in Fig. 3, it is successively immersed in tanks containing a cleaning solution; a cold water rinse; an acid dip; the No. 1 alrok solution (time 14 minutes); a reclaim bath; cold water rinse; the No. 2 alrok seal (time 14 minutes); a second reclaim bath; and a warm water rinse. The basket passes through a hot air drier and then is unloaded.

Baskets remain immersed in each tank approximately 3 minutes, except for the time indicated in the alrok tanks. About ½ minute is required for the conveyor to move baskets to the next tank.

The completely mechanized set-up at Willow run is based on a well-known treatment of aluminum materials, but is specifically arranged and perfected to

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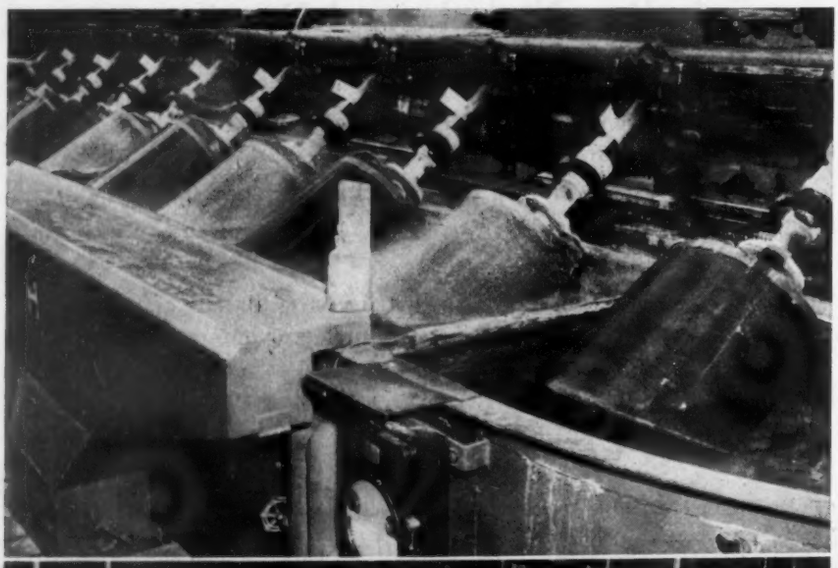

Top to bottom—

Fig. 1 — *Protective coating of aluminum oxide is put on surface of aluminum alloy parts by this coating machine. Baskets are agitated in various solutions and move by conveyor around the central fixture*

Fig. 2 — *Close-up of the automatic alroking machine*

Fig. 3 — *Worker at right loads a basket with rivets. Capacity of machine is* 700 *pounds per hour with* 40*-pound basket loads;* 1050 *pounds with* 60*-pound loads*

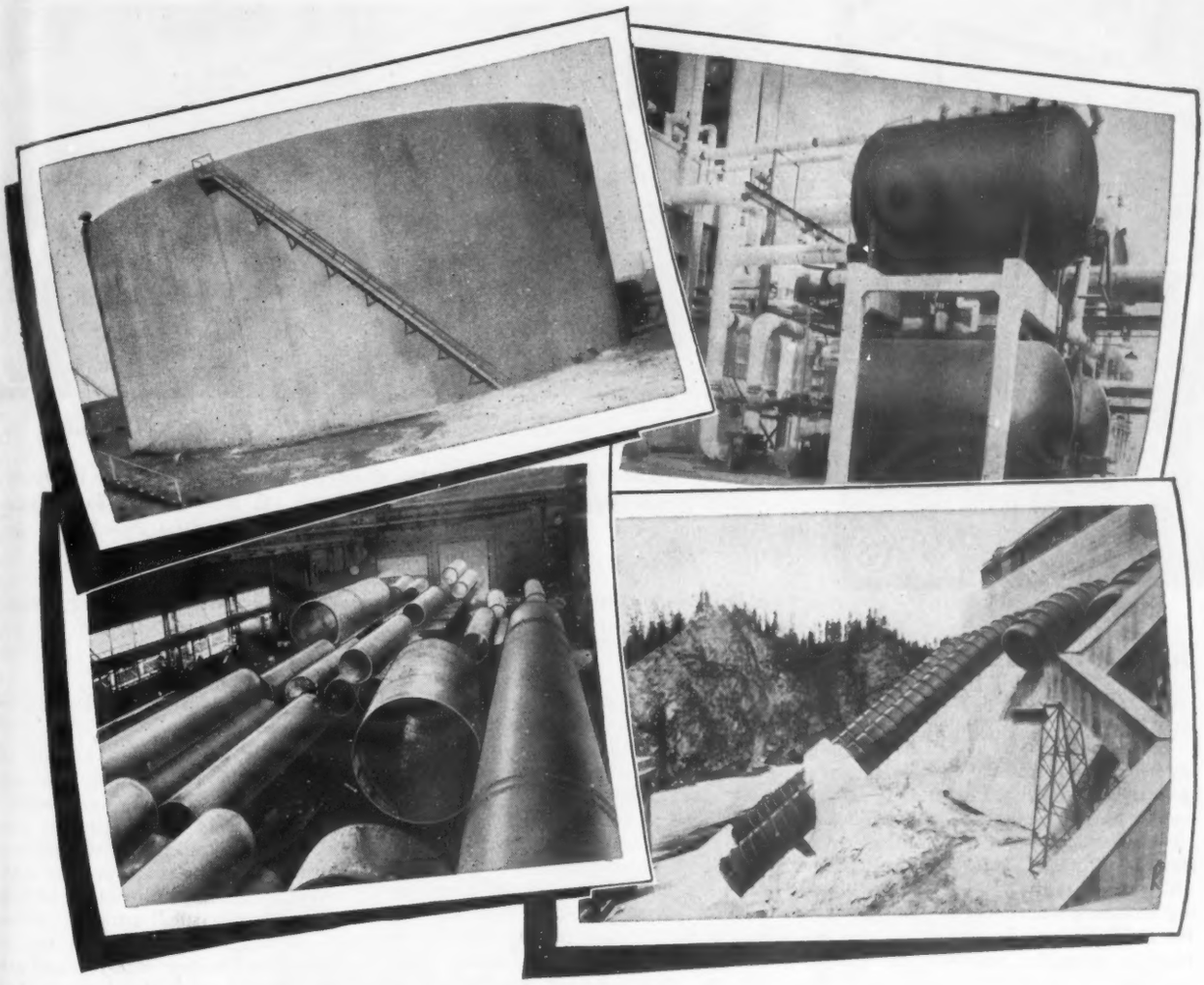

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Fig. 6—Plating zinc on steel in a barrel unit. Note brilliance of deposits

Fig. 7—General view showing portion of large plating room where the improved plating processes are kept busy with ordinary job plating work for outside manufacturers. Here cast iron wheels are being plated by Promat No. 90 cyanide zinc process

Fig. 8—Portion of complete facilities available in experimental plating laboratory. It is here that new processes are first put into production

Superimposed AC on DC

(*Continued from Page* 109)

rected by machine proper adjustment.

The importance of reversing the plating current for a small portion of each cycle lies in the fact that this breaks up anode passivity, the tendency for the electrochemical process to approach a sort of "saturated" or inactive condition. This anode passivity is one of the limiting factors in conventional plating work. By reducing or eliminating it, the reforming operation necessary to continued active plating is speeded and the entire plating operation increased in efficiency.

Superimposition also affects the hydrogen-overvoltage. This in turn cuts down the "starting" voltage normally required to begin plating action in the bath, thus further increasing plating efficiency.

Another effect that may be obtained by superimposition is to knock off excess deposits that normally tend to accumulate on edges and corners of the work, at the same time building up the deposits in the hollow sections. This tends to produce a more uniform thickness.

No Current Limits: Most important advantage of superimposition and the special solution additions in the zinc process is that they permit utilizing any current density that can be obtained on the work. This in turn means faster plating, greater output, smaller plating tanks and the enormous savings that accrue from these benefits.

For example, current density in plating zinc on steel usually is limited to approximately 35 amperes per square foot by operating conditions. Greater current densities produce "burning," a "fuzzy" surface and generally poor quality of the deposit. Much of this is due to the increase in size of the zinc crystals in the deposit.

The new zinc process, on the other hand, has no current limits whatever. It is free from "burning" and other undesirable effects at any current density that can be obtained in a still tank, semi or full automatic unit as was demonstrated by putting full output of a plating unit into a small sample. Although violent action took place at the work surface, no burning occurred and a brilliant deposit resulted. Instead of densities of 35 amperes per square foot for plating zinc on steel, Promat processes are employing as high as 100 amperes or more. Mr. Hicok points out that high quality finishes with a uniform, new brilliance are obtainable by the new process at any current density from 1 to 120 amperes per square foot.

Faster Deposition: These higher current densities are accompanied by correspondingly higher rates of deposition. It is not difficult to build up deposited metal thickness at a rate of 1/10,000-inch per minute. This means an electroplate 5/10,000-inch thick (sufficient for most purposes) can be deposited in 5 minutes. The very best time (for the same work) obtainable by conventional methods is 14 minutes, reports Mr. Hicok.

Reduces Installation Cost: Significance of this great speed is that it greatly increases production from the plating equipment. In setting up a new plant much less equipment is required. For example, on one job some 50,000 steel boxes and covers per month were to be zinc plated. Original plans called for installation of two 20-foot semi-automatic plating units which were to employ an 18 to 23 minute cycle to deposit a 5/10,000-inch layer of zinc.

When the Promat system was adopted it was found that the work could be handled by a single 16-foot semi-automatic unit working on a 10-minute cycle

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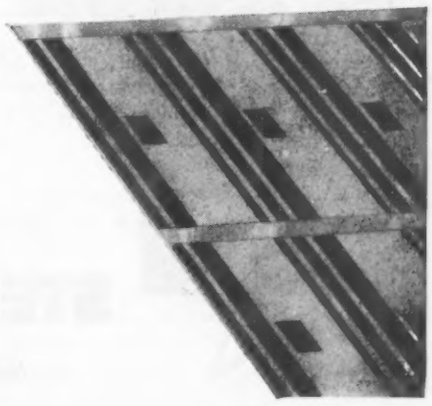

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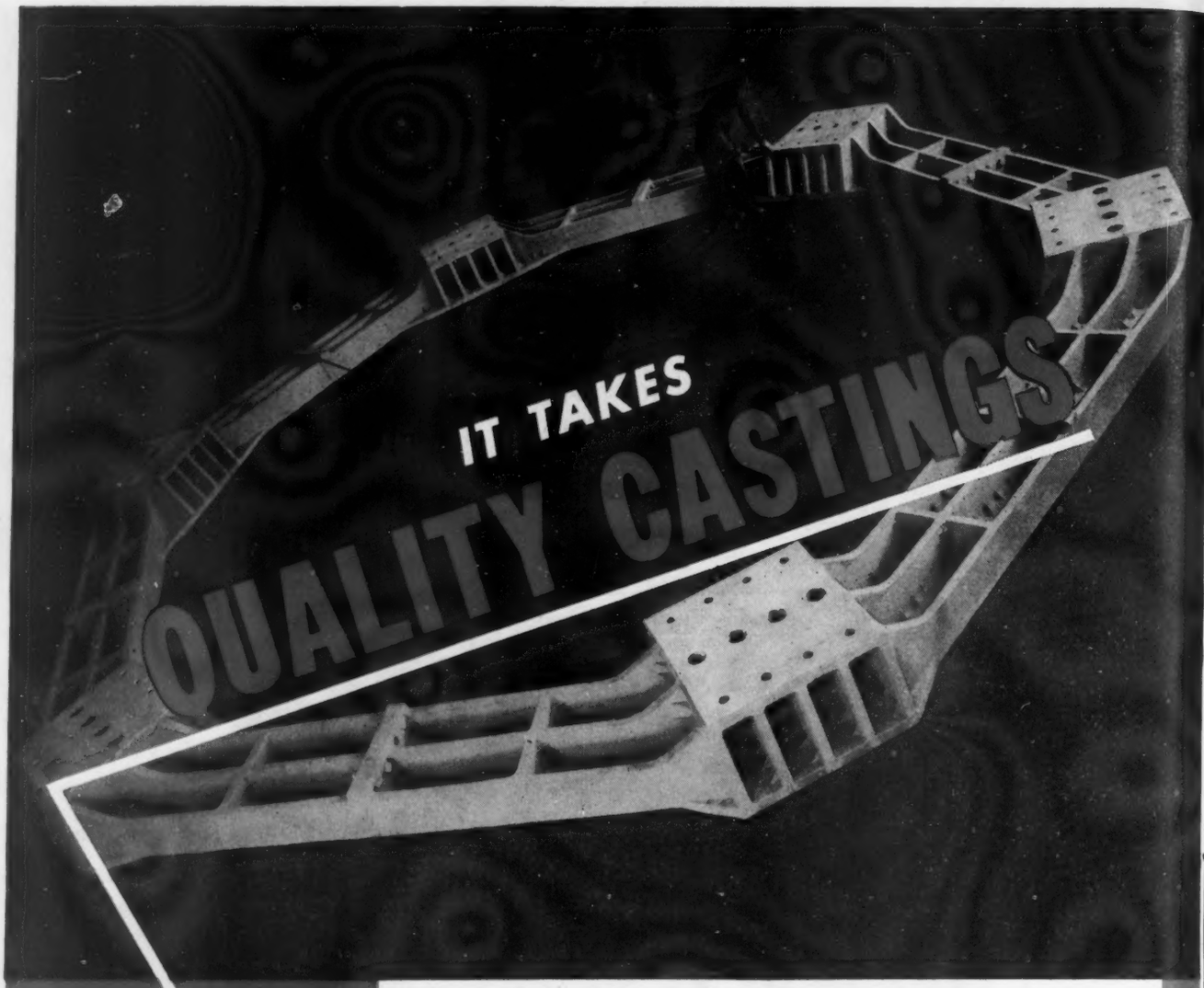

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"BASIC" FOUNDATION

This hexagonal blast furnace base, fabricated by PSF from accurately cast and machined sections, is not only a good example of quality work—it also illustrates the basically vital role that castings play in heavy machinery and equipment generally. They *must* be dependable—uniform in texture, sound and strong—correct to the "specs" in every detail. That's the way PSF's highly modern methods and facilities are set up to produce them for you—on special or production jobs—in carbon or alloy steels.

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Thus a complete plating unit was saved in making this installation. The cost of equipment to prepare the work for plating and for the post plating operation remained the same but the cost of the equipment for the actual plating operation was cut more than 50 per cent.

In another plant, fuze bodies are receiving a 3/10,000-inch deposit of zinc in a 4½-minute cycle in a 2400-gallon plating unit employing the Promat process. Some idea of the great production possibilities can be had when it is learned that more than 22,000 pieces are being plated every 10 hours in this unit.

Barrel Plating: Promat processes work well in all types of standard plating equipment, including still tank, automatic and semi-automatic machines. In barrel plating, for instance, one manufacturer was depositing zinc on steel screws in a plating cycle that required 45 minutes with a current of 275 amperes.

Now the same plating job is being handled in the same barrel on a 20-minute cycle using the Promat process and 490 amperes. This change actually doubled the amount of production obtained from the unit. This was possible because with the Promat process installed, more current was delivered to the work in the barrels and because of the unusual "striking" power of the process which covered the entire load with zinc more quickly.

Promat Cadmium: In addition to developing special additions and determining best superimposed A C conditions for plating zinc on steel, Promat has developed a similar process for plating cadmium on steel that produces an exceptionally lustrous deposit at any current density from 3 to 120 amperes per square foot. This great range means that extremely uniform color is obtained on irregularly shaped parts.

Current density for plating cadmium usually runs between 8 and 25 amperes with 15 amperes as an average value. But by the new process, any shape can be plated with excellent results at 60 amperes. This means that instead of requiring 22 minutes to deposit a plate 5/10,000-inch thick, it can be done in less than 5½ minutes by the improved process.

Since the brilliance of the deposit is derived from new cadmium compounds in the bath which are not removed by filtration, the solution is not expensive to maintain.

Promat Copper: Two improved processes for depositing copper have also been developed. One is a completely new alkaline copper bath of the Rochelle type which will not "burn" at a current density twice that normally used in similar electrolytes.

Deposits of this new copper process are reported to be ductile and soft, buffing easily to a high brilliance to produce an excellent base for subsequent deposits. It is excellent for masking work for selective heat treating.

Operation of the bath is flexible and easy to control, as are other Promat baths. Working temperature range is from room temperature to 180 degrees Fahr.

The second Promat copper process is called Promat A/C copper. This is largely dependent upon superimposition for its results. It includes a simple cyanide bath and makes very efficient use of the direct current used. Deposits in excess of 3/4 or 1/10,000-inch per minute are common with this process. Indications are that this process will find wide application in postwar copper, nickel, chromium plating in the automobile metal furniture and appliance fields.

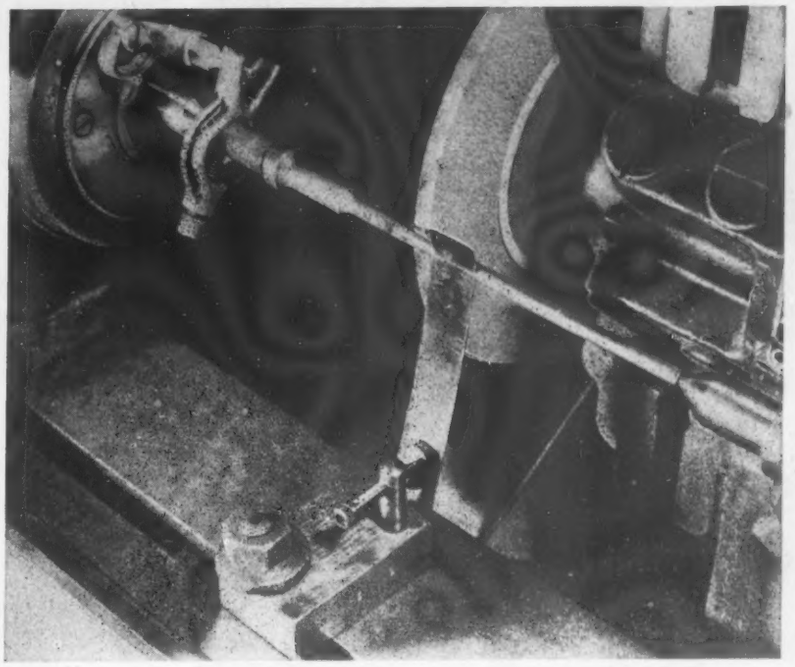
Other Processes: Now being developed by Dr. Chester and his staff at Promat are other improved processes for depositing brass, tin and other metals. The Waukegan plant includes an extensive and complete laboratory where experimental work is continually under way on new processes. Skilled electrochemists are busy investigating possibilities opened up by the successful application of the zinc, cadmium and copper processes already in commercial use.

Here also are found very complete facilities for pilot work, their pilot plating plant occupying a large room with a number of plating machines, power units and other equipment for investigating mass production operations by duplicating plant conditions. Here it is possible to test out new electroplating processes, formulas and compounds in actual shop practice.

The laboratory also provides facilities for weekly analyzing samples of solutions from all Promat installations. This helps avoid shutdowns due to contamination.

—o—

More than 3500 landing gears produced for the Navy's Grumman fighter by Willys-Overland Motors are said to have been tested without a single failure on a stand which simulates the structure of the plane's hydraulic mechanism for operating the gear in and out of the fuselage.



Vibration During Grinding Eliminated by

SPRING STEADY REST

The spring steady rest in the accompanying illustration is used successfully to eliminate vibration while grinding small diameter rods to extremely close tolerances. This useful, easily constructed device has greatly reduced spoilage of precision parts.

The upright spring, attached to the end of the base by means of a bridge clamp, rests against the center of the rod under pressure, thereby giving support to the work. The bridge clamp is used to avoid weakening of the spring with screw holes, which would otherwise be necessary.

The screw used to adjust the pressure of the spring has a spherical end composed of a steel disk and a leather pad which gives a cushioning effect between the two metal parts and tends to absorb vibration through the spring. This rest was devised by H. Rennie of the Punching, Tool and Die Division of General Electric Co., Schenectady 5, N. Y.

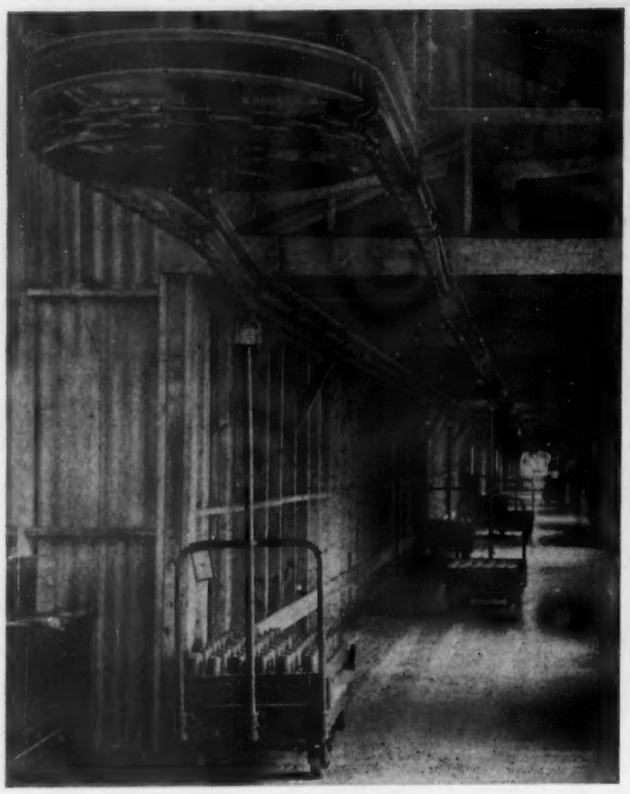


Fig. 1 (above)—General view of counterweighted automatic takeup at one end of one of the three long overhead trolley-conveyors which tows trucks in the Sangamon Ordnance plant

Fig. 2 (above)—Closeup shows how truck is positioned under conveyor so pusher carried along by chain can contact mast on truck and move truck along underneath conveyor. Data, photos from Link-Belt Co., Chicago

Truck-Tow Conveyors

. . . . provide answer to difficult job of intra-plant handling

INSTALLATION of three Link-Belt overhead trolley conveyors in the Sangamon Ordnance Plant, Illiopolis, Ill., shows how extremely useful this type of conveyor can be in serving production lines and in connecting the production of one building with that of another.

But, first, let us discuss shell loading plants in general. The areas covered by these ordnance plants are enormous. This is necessarily so, because of the variety of calibers and types of shell loadings required in present-day warfare, and, secondly, because of the number of loading lines dictated by these conditions.

"Safety distances" between the buildings comprising a line, in which a prescribed number of feet of separation is a function of the amount of explosive in adjacent buildings, may well stretch a single loading line into a length closely approaching three-fourths of a mile.

Smart management of these ordnance plants early recognized the enormity of the tonnage their loading schedules would require and accordingly made provision to conveyorize their production lines to insure delivery of such a large volume.

They also had in mind that conveyors would ease the burden of the line employe and that these lines might someday be "manned" by women for the most part.

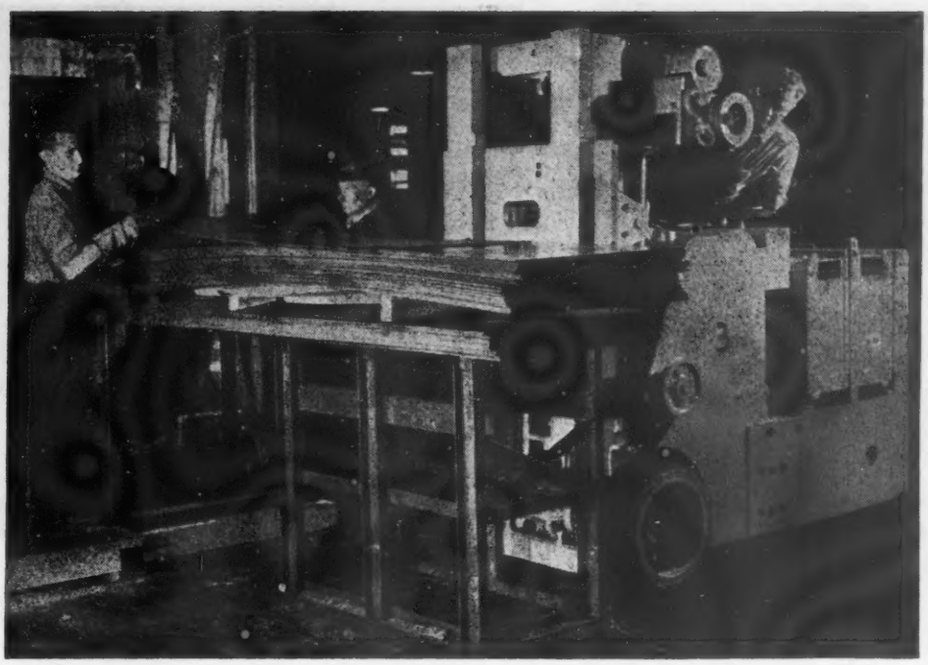
Today, a high percentage of the employes in these shell loading plants are women; they are handling explosives expertly and carefully; and as their work is exacting and requires mental alertness at all times, management is continually on the lookout for mechanical aids to eliminate the drudgery and fatigue resulting from the hand-moving of components comprising the finished round.

The Conveyor Problem: Considering that a single building in a loading line will approach 400 feet in length and be connected to the adjacent building by an enclosed ramp of another 450 feet in length, we have an average city block in length for one operation, in which thousands of shells per hour must travel progressively, building to building, toward final completion, prior to shipping.

The problem of keeping these shells moving was not so much one of whether it could be accomplished as *how* it might be done with maximum advantage. Primary requisites are safety above everything; the equipment installed must require only a minimum of lifting; the system must be simple, flexible and inexpensive; and it should fit into existing lines without building alterations.

Johnson & Johnson, manufacturers of surgical supplies, original operators and managers of Midland Ordnance Foundation, since taken over by Remington-Rand Inc., and combined with their Sangamon Ordnance Plant, had such a

(*Please turn to Page* 170)



SAVES minutes-motion-and manpower

Handling work to and from production machines, 24 hours a day, every working day is a stop-and-go service in which the battery industrial truck has natural advantages because of its inherent flexibility, economy and high availability. Its use is saving much valuable time and manpower in war plants.

With batteries exchanged two or three times a day, the truck is kept continuously supplied with power. While one battery is being charged, another operates the truck.

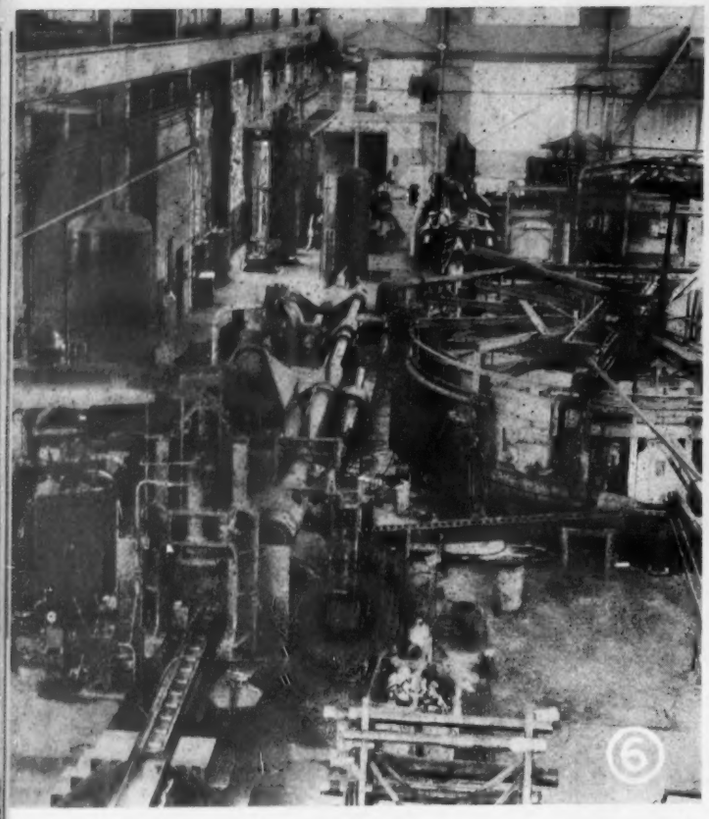
The truck starts instantly, accelerates smoothly; operates quietly; gives off no fumes; consumes no power during stops. Thus, it makes efficient use of power, and the current used for charging its batteries is the lowest-cost power available. Its electric-motor drives have a minimum of wearing parts and are inherently simple and trouble-free.

A battery industrial truck is most dependable and most economical when powered by Edison Alkaline Batteries. With steel cell construction, a solution that is a natural preservative of steel, and a fool-proof principle of operation, they are the most durable, longest lived, and most trouble-free of all types of batteries. *Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, N. J.*

In Industrial Trucks, Alkaline Batteries Give You These Important Advantages

- They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They can be **charged rapidly;** gassing cannot dislodge the active materials.
- They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.
- They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents.
- They can **stand idle indefinitely** without injury. Merely discharge, short-circuit, and store in a clean, dry place.
- They are **simple and easy to maintain.**

Edison
ALKALINE BATTERIES



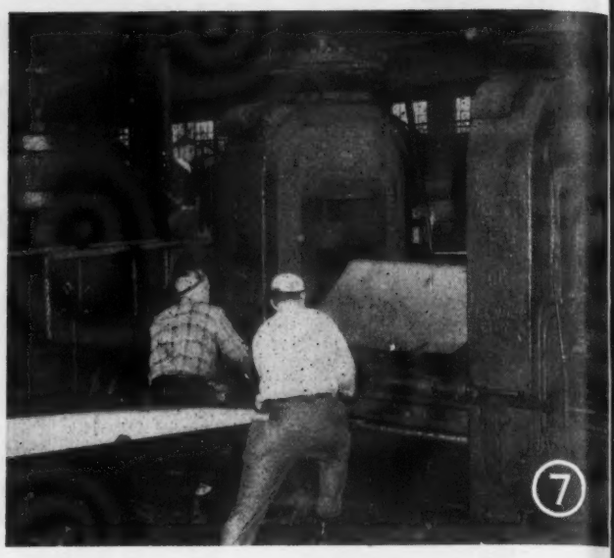


Fig. 6—New 4000-ton extrusion press for producing tubing and solid shapes of nickel and nickel alloys

Fig. 7 — Hot rolling Monel sheets on 2-high hot mill

Fig. 8—Fitting extruded and pointed Monel tubes into die for cold drawing on drawbench

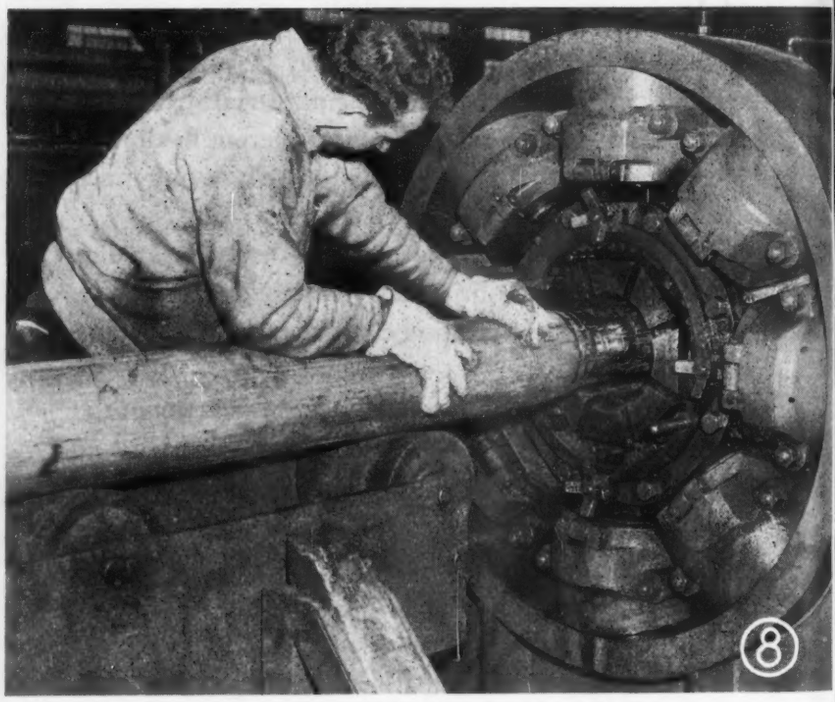
High Nickel Alloys

(*Continued from Page* 107)

10 per cent of the total electric power used by the plant is made with steam from waste-heat boilers. Approximately 75 per cent of the steam used by the steam hammers and other processes about the plant is supplied from waste-heat boilers. Fully 90 per cent of the electric power is purchased from a public utility company at 33,000 volts, 3 phase, 60 cycle and is stepped down to 2,200 volts for plant distribution.

The Huntington Works started operation in 1922. Before this malleable nickel and Monel were refined at the old Orford Works of the company at Constable Hook, N. J., and forged and rolled by outside plants on a toll basis. At present approximately 37 different nickel alloys are made at the Huntington Works. Monel is one of these alloys and has the following nominal composition: nickel 67, copper 30, iron 1.4, manganese 1.00, silicon 0.1, carbon 0.15 and sulphur 0.01 per cent.

The sulphide matte from which Monel is made comes from the company's smelters at Copper Cliff, Canada. Because of its high-sulphur content (18 per cent) the material is first crushed in a ball mill to the consistency of sand and is then put through a calcining furnace for a period of 4 hours. The calcining department is housed in a separate building and includes eight furnaces 80 feet long —four for nickel matte and four for sulphide matte. A hearth temperature of 2550 degrees Fahr. at front or discharge end of furnace is maintained. As the oxide is ejected from the furnace it is partially reduced to metal by the addition of charcoal and becomes the raw material from which Monel is produced.



Oxide material is refined in a separate building where the various operations have every appearance of open-hearth practice. Here eight open-hearth furnaces are provided for melting nickel and special alloys and for converting the oxide material to molten form suitable for charging into the electric furnaces.

Four 20-ton top-charged electric furnaces are operated in the melt shop. Each is equipped with three electrodes which are raised and lowered electrically. The tops of all furnaces are elevated by hydraulic equipment and are swung aside by hydraulic-operated toggles. Each furnace is tilted by two hydraulic rams which operate under a pressure of 800 pounds per square inch.

A carbide slag is maintained in order to aid in refining the molten charge. When the heat is at the desired carbon content a sample is dispatched to the laboratory through a compressed air carrier system and within six minutes a re-

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B&W INSULATING FIREBRICK STOOD UP UNDER FIRE WITH "PRACTICALLY NO MAINTENANCE"

The year Poland was invaded, a mid-western foundry rebuilt its annealing furnaces.

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port of the analysis is received by the melter. Life of the furnace lining averages between 150 and 160 heats; roof life is about 100 heats.

The 18-ton heats of Monel are transferred by crane from the casting pit to the pouring aisle where ingot molds with the hot tops are arranged in a single row similar to open-hearth practice. Ingots are poured up to 32 x 32 inches and average about 4000 pounds. Pouring of the heat is completed in from five to seven minutes.

However, treatment of the molten metal in the mold differs from conventional steel pouring practice. In order to prevent oxidation of the metal a shoveful of broken lime glass is placed on the top of the ingot several minutes after pouring is completed. A refractory-lined cap through which an electrode has been inserted then is placed on the hot top. Connection of electrodes to an 1800-kilovolt ampere transformer is had through busbars placed beneath the floor. An arc is struck and maintained for a period of about 12 minutes. During this time the glass in a molten state prevents the formation of a sinkhead and affords a homogeneous ingot. Before adopting this method of maintaining a bath of molten glass on top of the ingot, croppage loss amounted to 23 per cent; under present practice, however, croppage is insignificant.

At the opposite end of the electric melt shop are two coreless induction furnaces, one of 1000 pounds and the other of 4000 pounds capacity. These are employed for melting special alloy heats such as Inconel containing 14 per cent chromium and 80 per cent nickel. Each furnace taps into conventional type ladles, though when scheduled on certain alloys having critical pouring temperatures, the metal is poured direct from the furnaces into the molds. Molten glass and electrode fitted caps also are used after the metal is in the molds.

Before converting the ingots into semi-finished materials, they are milled on all four sides and corners. Chipping of ingots, blooms, and billets is done on hydraulically-operated billeteers. Incidentally, one of these machines has been in continuous operation for 3½ years. Following the milling operations the serviced ingots are forged into 8 x 8 and 4 x 11-inch blooms which later are rolled into bars, rods, shet bars and strip. Hammer shop has 8 and 5-ton, and 3500, 1500 and 800-pound steam hammers.

The 8 x 8-inch blooms are converted to 2 x 2-inch billets in 13 passes on a 24-inch 3-high blooming mill located in the merchant mill building. Billets are taken down to ¼-inch hot rolled rods on a rod mill train composed of three roughing, four intermediate and five finishing stands. Merchant shapes are rolled on a 20, a 14 or a 10-inch mill. Each mill consists of five stands of rolls. Hot strip, ¼ x 11 inches, is rolled on a 5-stand, 20-inch train. A 4-stand, 16 x 22-inch tandem mill also is provided for the production of cold strip; reduction from 0.125 to 0.062-inch is made in four passes. Two Steckel-type mills, 6 and 14 inches respectively, also are available for cold reducing any alloy into strip.

Considerable tonnage of Monel finds its way into sheets. A separate section of the plant is set aside for this purpose, and the old time roller would observe little difference between the hot mill floor of this mill and that of the conventional type sheet mill of a few years ago. Four 30-inch 2-high mills with the full complement of sheet and pair furnaces are provided. Nearby are four 2-high cold sheet mills equipped with tool steel rolls and repeaters. The latter, as previously mentioned, is only one of the many devices developed at International's plant at Huntington. It operates as follows: As the sheet comes from a pass it is moved away from the mill by a conveyor until free of the rolls. The conveyor then tilts until its front end is at the same height as the uppermost surface of the top roll; the direction of the conveyor belts then is reversed and the sheet is delivered over the top roll to the roller on the front side of the mill ready for another pass.

As mentioned at the outset, two cluster-type mills—the first to be built in this country—still are engaged in the cold rolling of sheets. Heavy reduction is afforded because of the small diameter work rolls. Pressure of the work rolls under actual operating conditions is distributed equally among eight bearings of large diameter and since the speed of the backup rolls is slow and the amount of pressure per unit of surface is low, only a minimum amount of power is required for operation.

Alignment Is Automatic

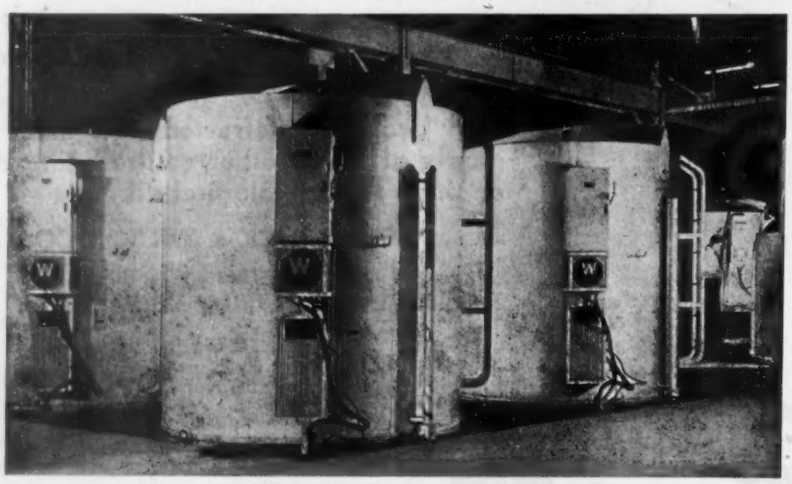
A high surface finish is given the Monel sheets by continuous operating abrasive belts whose alignment during the polishing operation is maintained by the use of an electric eye. These belts are stored in a room maintained at a constant temperature and humidity because under various weather changes the glue is affected and the belt is damaged.

The cold drawing division housed in separate buildings at the north side of the plant site is equipped for cold drawing Monel and other alloy tubing and rounds in various diameters and lengths. Tube reducing machines, each equivalent to eight drawbenches from the standpoint of production, are provided, though drawbenches of various capacities are available for producing small tubes.

The company operates one of the largest extrusion presses in this country—a 4000-ton unit. Its recent installation made possible for the first time the extrusion of Monel and other high-nickel alloys in the United States. Before this press was available certain types of nickel rods were pierced on outside mills and returned to the Huntington Works for drawing to specified sizes; some types of rounds even were shipped abroad for piercing because piercing facilities were not available in the United States. But, since the installation of the 4000-ton extrusion press at the Huntington Works, all operations involved in the production of the company's nickel alloys are executed within the plant.

In addition to nickel, Monel, and other high nickel alloys another product coming off the large extrusion press is an 8-inch tube made of gilding metal. A 2750-ton extrusion press also is scheduled on tube production using a blank 11 inches diameter and finishing 8-inch tubing in 12-foot lengths. Each length is cold drawn and then sawed into 150 bands for 155 millimeter shells.

One of the most interesting departments of the Huntington plant is the modern machine shop which occupies many hundred square feet. Here Monel recoil cylinders for large naval guns are machined to close tolerances and in complicated shapes.



NITRIDING EN MASSE: Fifty-eight bell type furnaces built by Westinghouse to nitride engine cylinders and internal gears at Ohio plant of Wright Aeronautical Corp. use 50 per cent less ammonia yet give close uniformity of hardness. This is believed to be the largest installation of its kind in the United States

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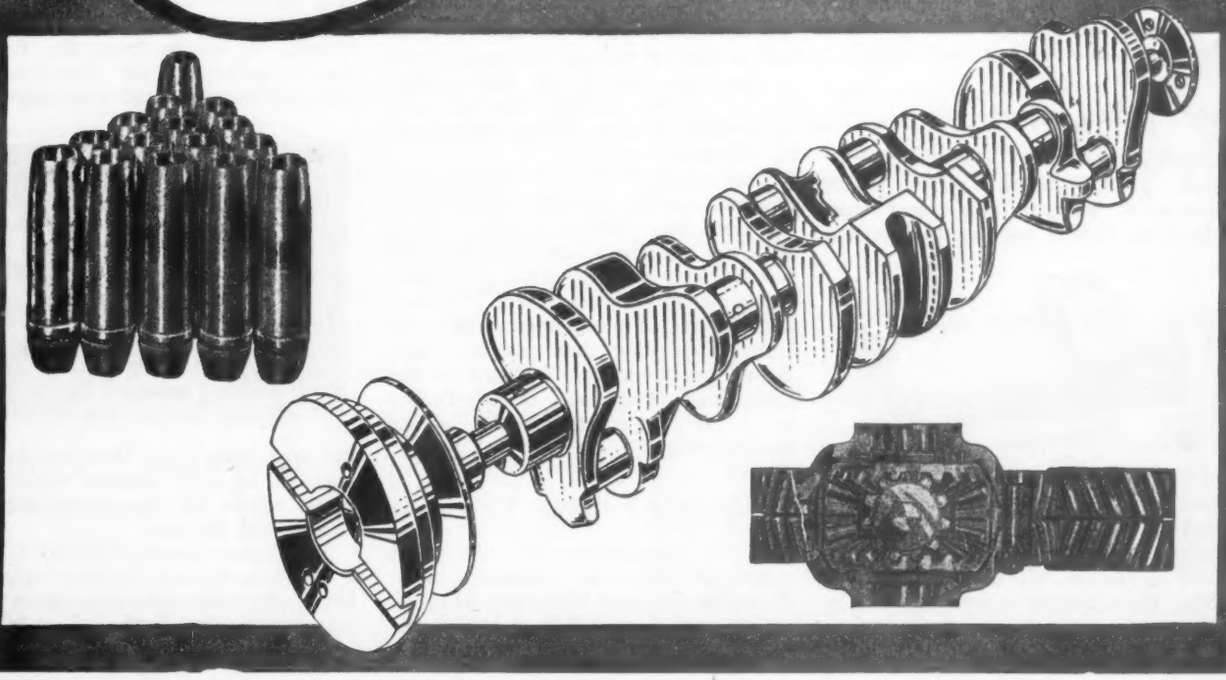
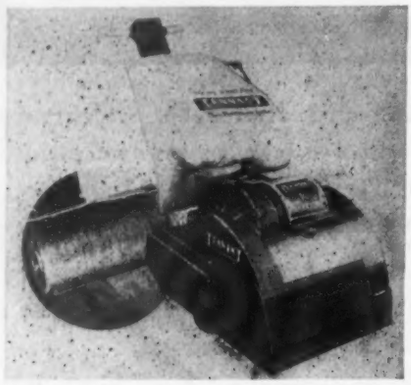


INDUSTRIAL EQUIPMENT

Floor Cleaner

For dry cleaning of strip wood floor in one operation, the G. H. Tennant Co., 2530 North Second street, Minneapolis 11, has developed a heavy duty floor machine. Fitted with a special 16-inch factory-wound steel wool roll this machine removes soilage and keeps floors smooth, sound and durable.

Operated by one man, the machine burnishes dirt from the floor. Through a



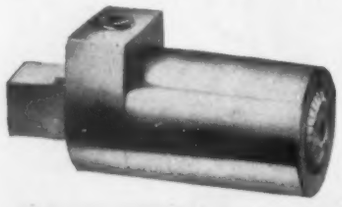
vacuum system powered by an 11-inch fan, light soilage is drawn into a large heavy fabric bag. Heavy soilage is thrown into a large removable hopper by centrifugal action of the steel wool roll.

Mechanical features of model K steel wool machine include a two speed 2½-5 horsepower electric motor geared to provide drum speeds of 850 or 1725 revolutions per minute. Extra attachments include a cylinder for floor sanding; a fiber brush; and a steel wire brush for cleaning heavy duty industrial floors.

Other features are a triple V-belt drive; 8-inch puncture-proof tires, with high-low wheel adjustment; motor reversing switch; machine-leveling adjustment; heavy duty drum bearing assembly with 1 3/16 inch ground shaft.

Boring Bar Insert

Nash-Zempel Tool Division, J. M. Nash Co., 2354 North Thirtieth street, Milwaukee, offers a new micrometer-adjustable boring bar insert in which



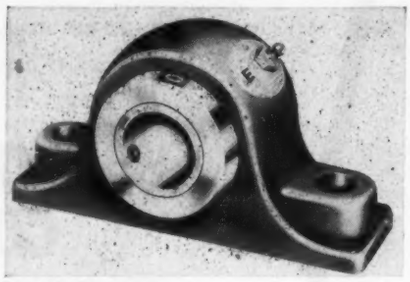
short pieces of scrap tool bits may be used as replacement cutters. One procedure is necessary to make a replacement cutter for this boring bar insert. It is only a matter of squaring up the cutter stock to fit the square hot in the insert. This can be accomplished in a minimum amount of time on any surface grinder and as the dovetail for the cutter is only a shallow cut, this operation does not require special tools.

The insert can be installed on any bar available by boring operation. The locating head of the boring bar insert fits snugly into the recessed slot of the bar itself and always assumes the same location. The set screw in the boring bar locates the insert and draws the head firmly against the shoulder of the recessed slot in the bar.

The micrometer dial of the insert has 25 graduations, each being one-thousandth of an inch. Adjustment is accurate and reliable. The loosening of one set screw permits the removal of the insert from the bar.

Bearings

Dodge Mfg. Corp., Mishawaka, Ind., announces a new bearing known as type E which is now available in both pillow blocks and flanged units. It is designed to give 30,000 hours or more of service under conditions for which it is adapted as determined by use of stand-



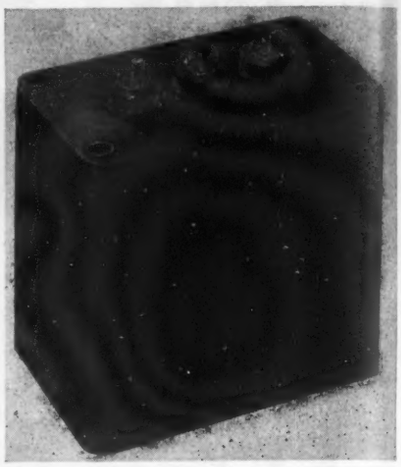
ard selection tables applying to the Dodge-Timken line.

On each end of the extended inner race is a steel collar having two headless set screws spaced 120 degrees apart and extending through clearance holes in the inner race to the shaft. These four set screws provide a positive lock to prevent rotation of the inner race on the shaft.

Labyrinth seals prevent loss of lubricant and protect bearings against damage from dust, dirt or moisture. These seals are equally effective whether the bearing is on or off the shaft. The bearings are completely assembled, lubricated and adjusted at the factory. While not fully self-aligning these bearings have enough self-alignment inherent in the design and arrangement of the Timken rollers to compensate for any normal misalignment.

Frequency Filters

United Transformer Co., 150 Varick street, New York 13, announces newly developed low and high pass filters designed to pass a wide band of frequencies, either above or below a specific point. The four types include types H.P.L. (high pass line) and L.P.L. (low pass line) which have characteristic impedance of 500 ohms designed to operate on a line of 500/600 ohms; type H.P.I. (high pass interstage) and L.P.I. (low pass interstage) which have a primary impedance of 10,000 ohms, de-

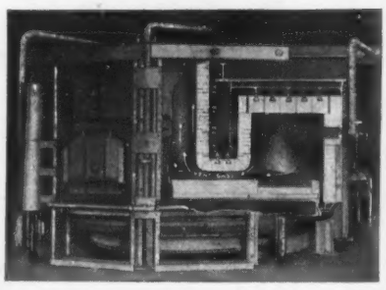


signed to operate from the plate of a triode tube.

These units employ a dual alloy magnetic shield which reduces inductive pickup to 150 millivolts per gauss. The dimensions in hermetically sealed cases are 1½ x 2½ x 2½ inches. Filters of H.P.I. and L.P.I. type can be supplied for any cutoff frequency from 200 to 10,000 cycles.

Forging Furnace

A new rotating hearth forging furnace with depressed roof and center venting stack (patented) is offered by Johnston Mfg. Co., 2825 East Hennepin avenue, Minneapolis 13. The waste gases are allowed to escape from the furnace chamber at hearth level. The depressed roof with center vented stack carries all



the vent gases away from the furnace chamber at 2300 degrees Fahr. The hottest gases are always brought into contact with the stock.

The depressed roof construction forms a ring type furnace chamber which allows better control over the entire heating range by zoning the chamber. No

(All claims are those of the manufacturer of the equipment being described.)

ANNOUNCING

ELECTRICAL SPECIALTY COMPANY, 316 Eleventh Street, San Francisco 3, California
INSULATION & WIRES, INC., 2127 Pine Street, St. Louis 3, Missouri
INSULATION MANUFACTURERS CORPORATION, 565 Washington Blvd., Chicago 6, Illinois
MICA INSULATOR COMPANY, 200 Varick Street, New York 14, New York
NATIONAL ELECTRIC COIL COMPANY, Columbus 16, Ohio
PREHLER ELECTRICAL INSULATION CO., 564 West Monroe Street, Chicago 6, Illinois
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Rapidly growing demands for DC-993 Silicone Varnish are being filled from stocks of the above newly-appointed distributors.

Through these representative sources of supply, Dow Corning, first producer of Silicones, is able to extend the application of this revolutionary insulating material—a heat curing, high temperature stable, moisture-proof silicone varnish destined for an important place in the new age of electrical machinery and equipment.

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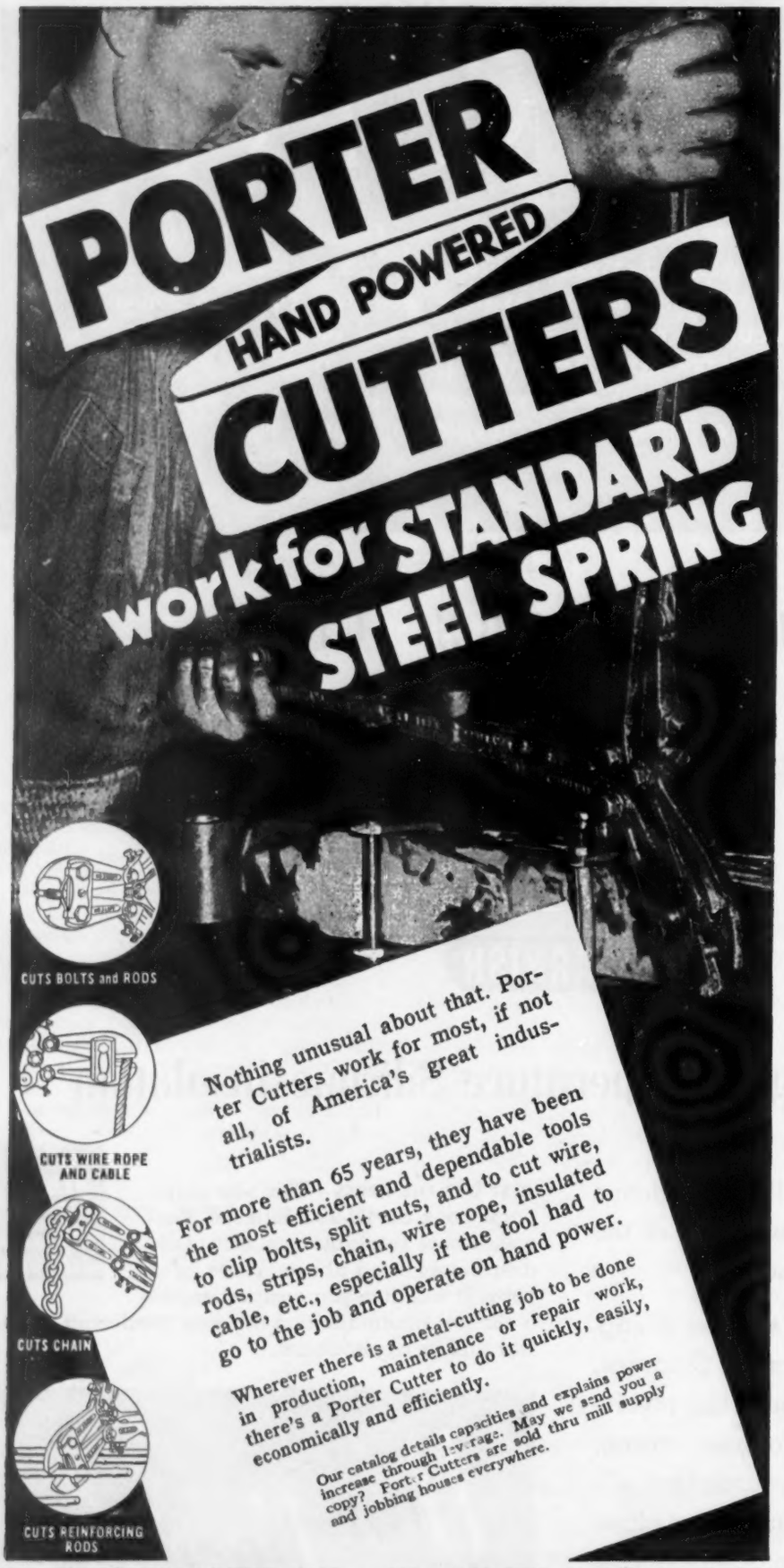
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Nothing unusual about that. Porter Cutters work for most, if not all, of America's great industrialists.
For more than 65 years, they have been the most efficient and dependable tools to clip bolts, split nuts, and to cut wire, rods, strips, chain, wire rope, insulated cable, etc., especially if the tool had to go to the job and operate on hand power.
Wherever there is a metal-cutting job to be done in production, maintenance or repair work, there's a Porter Cutter to do it quickly, easily, economically and efficiently.
Our catalog details capacities and explains power increase through leverage. May we send you a copy? Porter Cutters are sold thru mill supply and jobbing houses everywhere.

H. K. PORTER, INC., 401 EVERETT 49, MASS.

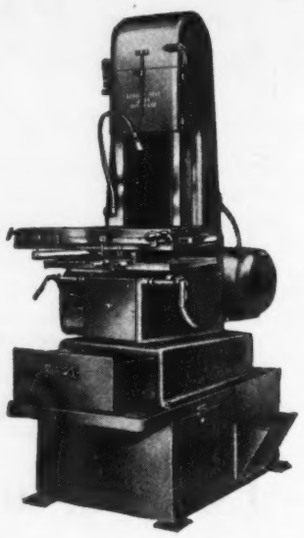
PORTER HKP CUTTERS

heating space is lost as the center vent occupies the center portion of the furnace. The roof is suspended from a steel frame with the lining built up of interlocked tile and sealed with cement. This arch construction is adaptable to all types of rotating table furnaces.

Wet Belt Grinder

Possibilities of wet belt grinding as fast, economical and accurate method of production machining, as well as for tooling repair and maintenance operations, are afforded by a line of surfacing machines made by Porter-Cable Machine Co., Syracuse 8, N. Y. The machines have heavy cabinet frames which give support to the work and keep table and platen aligned, making it possible to hold close tolerances at maximum rates of cutting. Work can be held within 0.0005-inch limits.

For use with these machines, an automatic, hydraulically controlled feed table has been developed. This gives control of cutting speed, pressure, size and finish. The machine shown here is



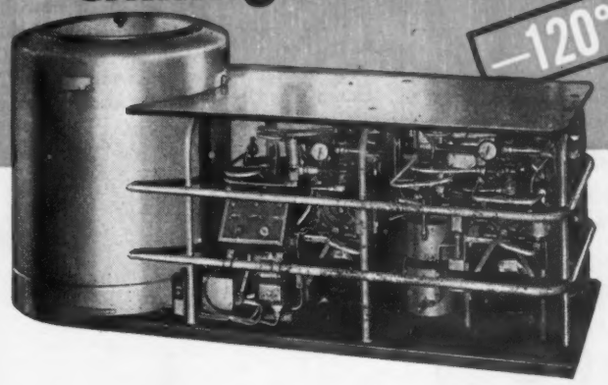
so equipped. This table is adapted for the use of quick-acting work-holding fixtures. It can be operated by hand as well as automatically.

When employing the automatic cycle, the operator loads the work when the table is to the right and away from the belt. When table is moved to the left, a trip engages the control lever. Thereupon, the table automatically advances towards the belt. This forward feed may be set for two speeds; fast for quick approach, and slower to give correct cutting effect while the work is in contact with the belt. A micrometer stop cuts off the feed the instant work is to size.

With standard plain table of 17½ x 11¼ inches, working area with an 8 x 9 inch plate behind the belt is 7¾ x 9 inches; with a 12 inch plate it is 11¾ x 9 inches; and with a 16 inch plate it is 15¾ x 9 inches. When using the automatic feed table, working area of which is 11¼ x 24½ inches, the 8 inch plate gives working surface of 7½ x 9 inches;

CHECK These Case Reports to Learn How Others Increase Hardness and Toughness of Steels

. . . by Cold Treating in Deepfreeze Industrial Chilling Machines



CASE REPORT No. 1

PART—Ball Bearing Race.

MATERIAL—S.A.E. 52100 Chrome Steel.

RESULTS—After hardening and drawing, this race is Cold Treated at —120° F. Rockwell C scale hardness of 67½ to 68 results, with fine grain structure and improved lapping characteristics. Brinelling of the races is completely eliminated.

CASE REPORT No. 2

PART—Gear for Naval Component.

MATERIAL—S.A.E. 2512 Carburizing Steel.

RESULTS—Heat treating failed to bring this part to the specified hardness. After sub-zero treatment in a Deepfreeze machine, a hardness of 64 Rockwell C scale was obtained; best previous values ranged from 56 to 57.

CASE REPORT No. 3

PART—Machine Tool Overarm.

MATERIAL—S.A.E. 4615 Molybdenum Steel.

RESULTS—Heat treating produced only 57-60 Rockwell C scale hardness. Sub-zero treatment increased hardness to 60-62 Rockwell and eliminated distortion in the length of the bar.

CASE REPORT No. 4

PART—Punch Die.

MATERIAL—Atha Pneumatic Steel.

RESULTS—After heat treating and carburizing, the highest reading on this part was 58-59 Rockwell C scale. By cold treating, the hardness was uniformly increased to 61-62 Rockwell C.

These actual case reports from the field are typical of many remarkable increases in steel hardness obtained by using Deepfreeze sub-zero chilling to supplement normal heat treating procedures.

Why Cold Treating Makes Steel Harder

Metallurgists have found that steels rarely reach full hardness until a complete transformation of Austenite into Martensite is accomplished. In ordinary heat treating, this transformation is still incomplete when the steel has been cooled to room temperature.

By Cold Treating at —120° F. in a Deepfreeze machine, practically all Austenite remaining after quenching to room temperature is transformed into Martensite with a resulting increase in hardness.

Learn How Cold Treating Can Help You

To determine the exact benefits you can derive from applying Cold Treating to your hardening problem, consult the Deepfreeze Engineering Service. Their wide field experience and metallurgical facilities are at your disposal. Your inquiry entails no obligation whatever.

FREE COLD TREATING DATA BOOK For the complete and latest data on the use of Cold Treatment for metals in industry today, get the Deepfreeze Metal Chilling Data Book. In this handy working guide on the use of industry's newest production tool you can learn how to use sub-zero temperatures for the shrinking, testing, hardening and stabilization of metals in your plant. A free copy can be obtained by writing Deepfreeze, North Chicago, Ill. Write today for as many copies as you need.

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TRADE MARK DEEPFREEZE REGISTERED UNITED STATES PATENT OFFICE

Industrial Chilling Equipment for Shrinking, Testing, Hardening and Stabilizing Metals

DIVISION OF MOTOR PRODUCTS CORPORATION DETROIT, MICHIGAN

150% Safety margin in every CM HERC-ALLOY SLING CHAIN

That's right! Herc-Alloy formula steel has a tensile strength that offers a 150% factor of safety—an important contribution to uninterrupted production and maximum safety to both men and materials. CM Herc-Alloy Sling Chains seldom if ever require annealing. The short stubby links are electric welded by the patented Inswell process. As for service life . . . some of the earlier CM Herc-Alloy Sling Chains are still on the job after years of continuous duty.

Here is sling chain par excellence measured from any angle. Check it from the angle of your job application and safety requirements. Your mill supply distributor will help you, or write us

HERC-ALLOY LINK SHOWING PATENTED INSWELL WELD

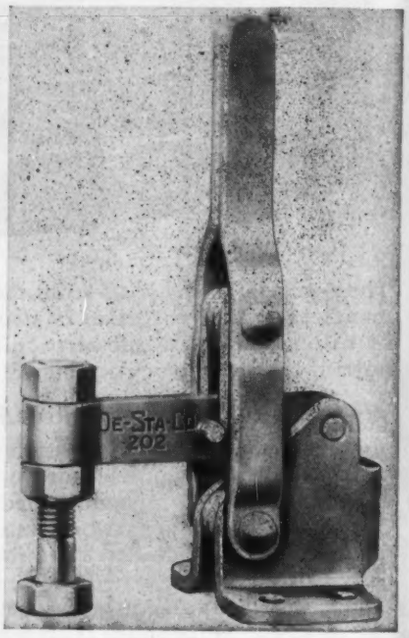
COLUMBUS-McKINNON
CHAIN CORPORATION
(Affiliated with Chisholm-Moore Hoist Corporation)
GENERAL OFFICES AND FACTORIES: 118 Fremont Ave., TONAWANDA, N. Y.
SALES OFFICES: New York, Chicago and Cleveland

with 12 inch plate it is 11½ x 9 inches; and with 16 inch plate it is 15½ x 9 inches. Longer work can in each case be machined by traversing it across the working area, either free hand or in a guiding fixture. These machines are not limited to rapid roughing and finishing of plane surfaces. They are also effective in generating bevels, angles, arcs and various other shapes. Such work can be done free hand or by means of fixtures.

Plastic bonded, flat bias joint abrasive belts, 9 inches wide by 107 inches in circumference and in grits ranging from 24 to 600, are used, choice of grade depending on whether the operation is roughing, finish grinding or polishing.

Aluminum Toggle Clamp

Known as model 202-A, a new light duty, all aluminum toggle action clamp is announced by Detroit Stamping Co., 359 Midland avenue, Detroit 3. This clamp was developed for use on portable



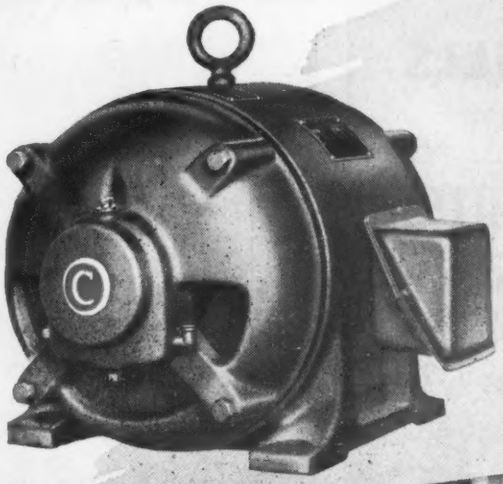
or spot welding fixtures but can now be used wherever space limitations or weight of clamp is a factor.

It is made of pressed metal parts, weighs less than three ounces, including steel hold-down spindle and adjustment nuts. The clamp measures 2½ inches long, 1⅝ inches wide at base and 3¾ inches high when in locked position.

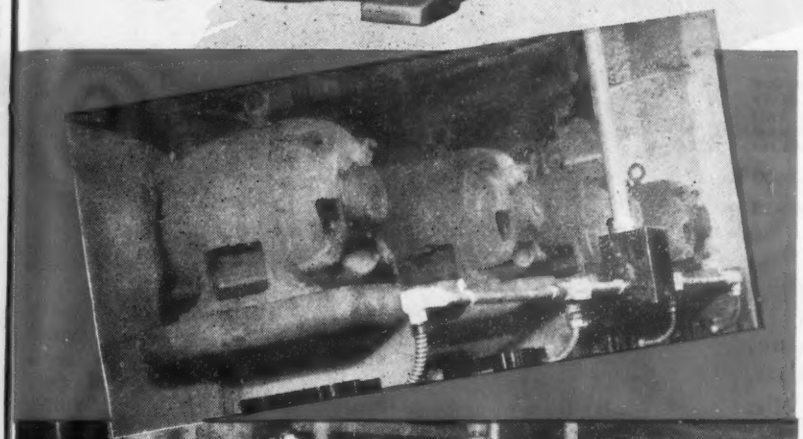
Holding Fixture

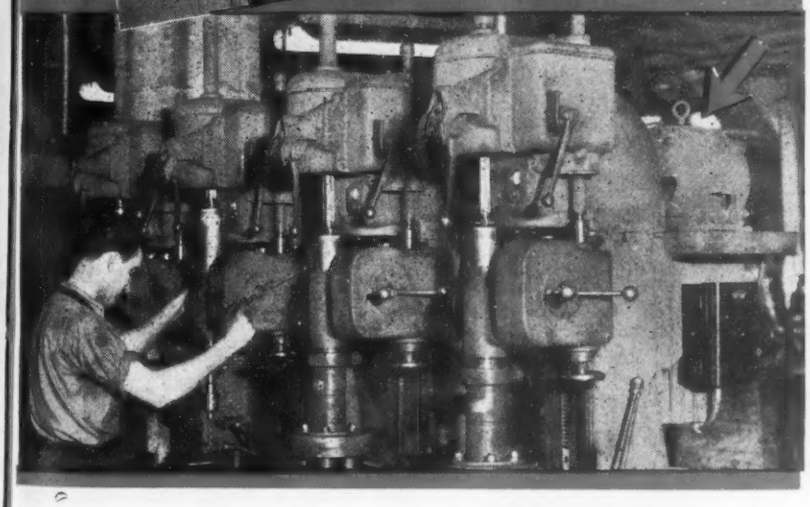
Zagar Tool Inc., 23880 Lakeland boulevard, Cleveland 17, announces a new air operated holding fixture in conjunction with the new Warner & Swasey precision tapping and threading machine. A special mounting by Warner & Swasey tips the fixture about 20 degrees for loading and unloading. The operator steps on a treadle which tilts the holding fixture to load. When the treadle is released the fixture is returned to the vertical position by means of a spring.

MODERN CENTURY PROTECTED INDUSTRIAL MOTORS



Are an important part of production tooling to meet industry's *peacetime* demands for lower costs





The upper half of the Century Form J general purpose, open, continuous duty motor is closed to minimize the possibility of dripping liquids or falling solids entering the vital parts of the motor.

This added protection feature is made possible because of the scientifically designed Century mechanical ventilation system. All motors generate heat, so if the insulation is to have long life, the heat must be rapidly carried away from the windings. Two fans located behind each bearing bracket draw cooling air "IN" through the openings of both bearing brackets. This cooling air is deflected first around the bearings to keep them cool and then across the windings and to air passages between the outer surfaces of the magnetic core and the frame — the heated air being finally discharged "OUT" through the lower sides and bottom of the frame.

These modern, protected, industrial, general purpose motors meet the requirements of more than 80% of all polyphase motor applications. This Form J construction is at present available in 2 to 25 horsepower four-pole frame sizes.

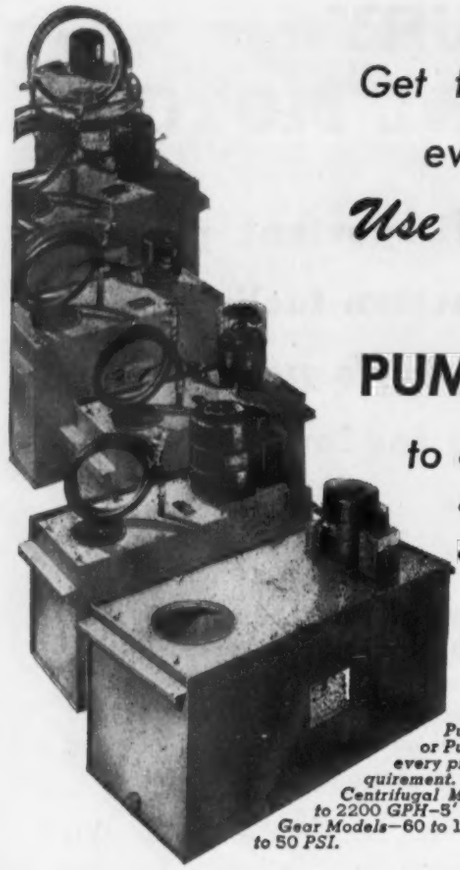
Your Century Motor Specialist has full information and his wide experience may well prove valuable to you. Call him today.

Century C MOTORS

400

CENTURY ELECTRIC COMPANY, 1806 Pine Street, St. Louis 3, Missouri

Offices and Stock Points in Principal Cities



Get the most out of every machine

Use GRAY-MILLS Portable PUMPING UNITS

to • INCREASE PRODUCTION
• PROLONG TOOL LIFE
• IMPROVE FINISH

There is a Gray-Mills Pumping Unit or Pump for most every production requirement. Centrifugal Models—3600 to 2200 GPH—5' head. Gear Models—60 to 180 GPH—10 to 50 PSI.

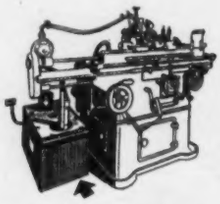
Gray-Mills complete, portable Pumping Units are suitable for many different jobs. They apply—in controlled volume, intermittently or constantly—coolants, lubricants, quenching and hydraulic oils, chemicals and other fluids.

Widely used as coolant systems on lathes, grinders, drill presses and other machine tools, they step up production, prolong tool life and improve finish. By their dependable performance, they quickly pay for themselves in lowest production costs.

Gray-Mills Units are used also for automatic application of lubricants to punch press dies, and to provide a compact oil circulating system for machine lubrication.

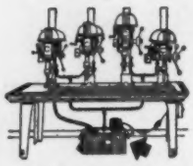
Whatever your needs — you will probably find a Gray-Mills Unit or Pump the simple, low-cost answer.

Send for this new condensed catalog—gives complete details, prices and specifications.



COOLANT SYSTEM

Model 1000 Centrifugal Pumping Unit applying coolant in large volume to grinder.



COOLANT SYSTEM

Productive capacity of drill press increased by addition of this Gray-Mills Pumping Unit.

PUNCH PRESS DIE LUBRICATION

A Gray-Mills Pumping Unit supplying lubricant to a punch press die. Intermittent operation effected by Gray-Mills Flow Control System.

GRAY-MILLS CO., 1937 Ridge Ave., Evanston, Ill.

PROMPT DELIVERY

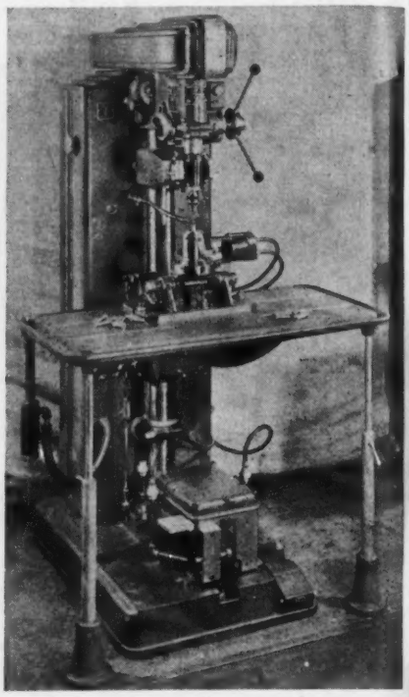
Complete Portable

PUMPING UNITS

FRACTIONAL H. P. PUMPS
INDUSTRIAL FLUID REFRIGERATING SYSTEMS
PARTS CLEANING SYSTEMS

A micro switch then starts the operating cycle. When the cycle is completed the machine stops.

Automatic valves were installed at the control box to open and close the collet when the fixture is tilted for loading and unloading. Air pressure is used only to operate the opening and closing mechanism. The collet does not move vertically in closing, therefore, the work can be held to close tolerances in second operations, such as milling slots on a milling machine, drilling and tapping to a given depth, counterboring or spotfacing on a drill press, etc.



Portable Saw

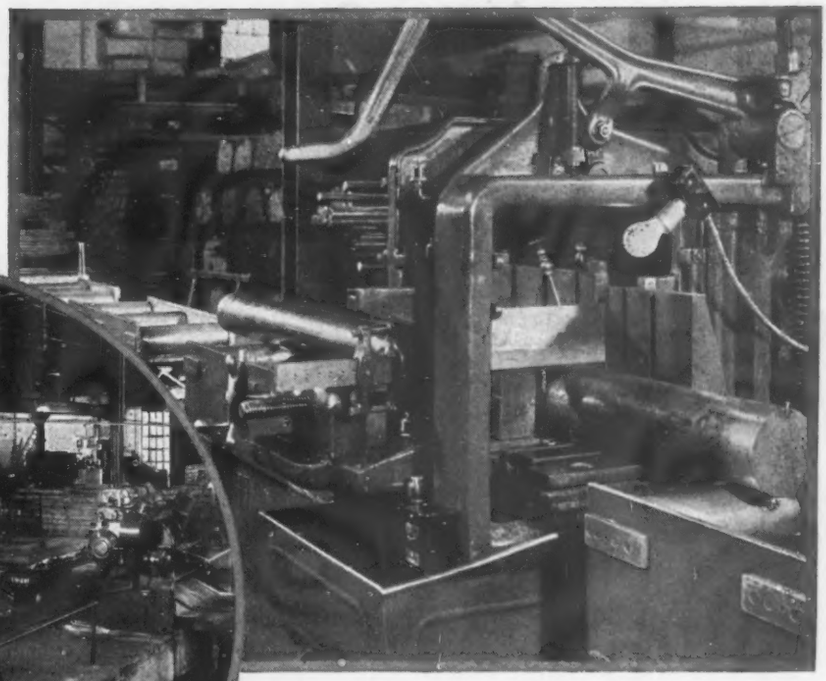
The constant centered drive, a patented feature of this new saw insures belt alignment regardless of the angle. The saw operates with equal smoothness at any angle, on or off the ground. Four 112-inch V-belts connect two constant centered drive pulleys. Wheels have needle bearing and have heavy-duty industrial type dual pneumatic tires as optional equipment.

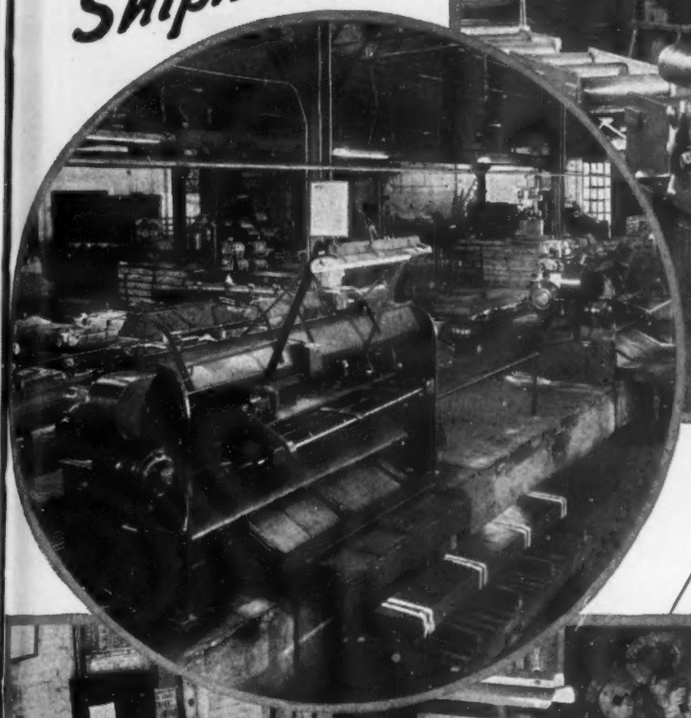
The unit features a 6-horsepower air-cooled engine and the frame is of tubular welded steel, the axle of heat treated steel. It has a 30-inch blade with large teeth and deep gullets. Saw speed is 1150 revolutions per minute. This saw is manufactured by Harry A. Lowther Co., 141 West Jackson boulevard, Chicago 4.

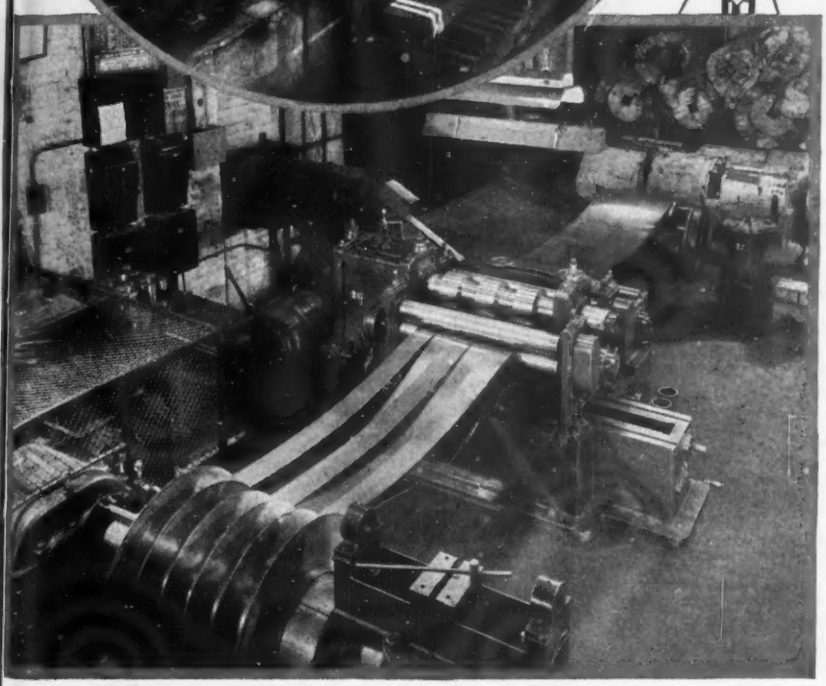
Dust Collector

Manufactured in four sizes, the new portable dust collector offered by Dust Filter Co., 4418 North Clark street, Chicago 40, removes from the air dangerous and obnoxious dusts arising from industrial operations such as lint, shavings, grindings, etc. The principle of

Immediate Warehouse Shipments







Shearing
Edging
Sawing
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Slitting

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GENERAL STEEL WAREHOUSE CO. Inc.

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COLD ROLLED SHIM STEEL • SHEET STEEL • ROUND EDGE FLAT WIRE • FEELER GAUGE
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How much are You paying

FOR INDUSTRIAL TRUCK MAINTENANCE?

Checking wheel alignment is one of many easy maintenance operations which pays big dividends.

compare *Your Costs* WITH THESE:

The rugged construction of Baker Trucks, and the easy accessibility of all parts requiring service, result in unusually low maintenance costs. The following actual records are typical of many where regular inspection and lubrication are a matter of routine.

CASE No. 1 A midwestern railroad paid a total of $144.70 for replacement parts for two Baker Trucks which were in continuous service over a period of 7 years, 4 months—an average of only 82c per month per truck.

CASE No. 2 A large motor truck manufacturer with a fleet of Baker Trucks, reports that during the last 5 years the total maintenance expense, on a truck purchased 26 years ago, exclusive of tires, has not exceeded $50.00 per year.

CASE No. 3 A large aircraft parts manufacturer bought 11 Baker Trucks 3 years ago for his huge new plant. Trucks operate 24 hours a day under most severe conditions. During the last 12 months (3 years of normal service) maintenance costs averaged $350.00 per truck—a remarkable record considering that they had seen the equivalent of 9 years of gruelling, uninterrupted service.

CASE No. 4 A wire mill reports that their Baker Truck, purchased in 1918 is still in regular service, and that maintenance cost—exclusive of tires—has been less than $50.00 per year for the last 5 years.

CASE No. 5 A food canner using a Baker Hy-Lift Truck purchased in 1931, writes: "Our superintendent tells us that surprising as it may seem, no new parts are necessary. Your representative told us what adjustments could be made—and it seems that they could do it right at the cannery. It looks like this is just one more blue ribbon for Baker. It is amazing that after all these years a general replacement of essential parts is unnecessary."

CASE No. 6 A brass fitting manufacturer reports that his 4 Baker Trucks, in continuous service for 3 to 5 years have required no overhaul—and factory replacement parts, exclusive of tires, have averaged about $10.00 per year per truck.

CASE No. 7 A Baker Truck operating nearly four years in the plant of a transportation equipment manufacturer, has needed no major overhaul. Maintenance costs, in spite of severe service conditions, have totaled only $150.91—less than $40.00 per year

To help you reduce maintenance costs on your individul trucks, write for "Industrial Truck Care Pays You Dividends."

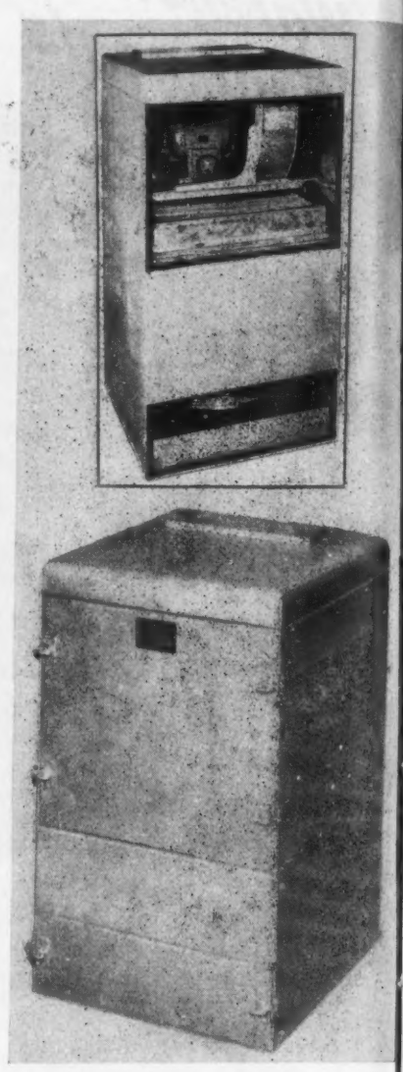
BAKER INDUSTRIAL TRUCK DIVISION *of The Baker-Raulang Company*

2167 West 25th Street • Cleveland, Ohio

In Canada: Railway and Power Engineering Corporation, Ltd.

Baker INDUSTRIAL TRUCKS

the unit is the compound action on the air-borne dust, first by centrifugal separator from the air stream and second by impingement on the filter surface. It maintains constant static air suction of more than 4 inches at velocity of over



5000 LFM. Units weigh from 75 to 200 pounds and are 30 to 51 inches high.

Filter assembly consists of two corrugated layers of wire mesh covered with 60-mesh filter cloth. Filtered air is discharged through muffler to deaden air noise with minimum resistance back into the room.

Electronic Timing Control

Electronic timing control on the new Identometer eliminates the human factor in timing tests for positive identification of rolled or forged ferrous alloys. The function of the unit is to identify rolled or ferrous alloy for stocking or processing. This is accomplished by providing a known sample against which the unknown pieces are checked quickly by the instrument.

It utilizes the principle of thermoelectricity. All metals and alloys, with the exception of pure lead, exhibit thermoelectric effects to varying degrees. When two metals or alloys are brought into con-

CHICAGO

GRINDING WHEELS AND MOUNTED WHEELS

Chicago Wheel takes pride in providing you with exactly the wheel you need, for exactly the job you have, to give you exactly the finish you want!

There's half a century of experience behind this, fifty years of specializing on grinding wheels—grinding wheels with hundreds of varieties in shape, size, abrasive and bond formulas, engineered for the right tool speed and work pressure.

Come to Headquarters—Our long experience and testing laboratory are at your service, free for the asking. Tell us about your tough grinding or polishing job. Our abrasive engineers will report promptly, give you their tested solution.

TRY ONE FREE—A Chicago Mounted Wheel or an FV Bond Grinding Wheel sent promptly on request. Tell us size preferred and what you have to grind.

CHICAGO GRINDING WHEELS—For the duration, sizes up to 3" in diameter only, in various bonds including FV, the bond with a pedigree.

CHICAGO MOUNTED WHEELS—For internal or external grinding, burring and polishing. Made to fit any tool. Many styles, shapes and shank sizes.

Send for Illustrated Catalog

CHICAGO WHEEL & MFG. CO.

1101 W. Monroe St., Dept. 3F-2, Chicago 7, Ill.

Send catalog. Interested in

☐ Mounted Wheels
☐ Grinding Wheels
☐ Send test wheel

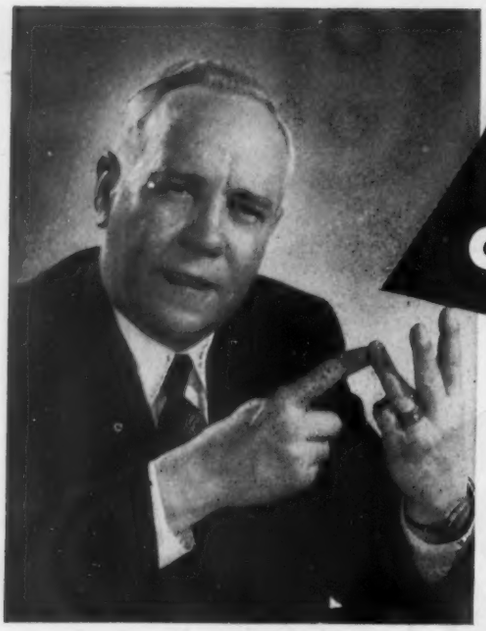
Size _____

Name _____

Address _____

ARMY-NAVY E — MOUNTED WHEELS — SMALL GRINDING WHEELS

Half a century of specialization has established our reputation as the Small Wheel People of the Abrasive industry.



Does 3 JOBS at ONE TIME

1 CUTS HARDENED GRIME LOOSE

2 PICKS UP SOILAGE

3 LEAVES FLOORS SMOOTH, CLEAN AND NON-SLIPPERY

Floors are Left READY for IMMEDIATE USE

The Tennant Model K Industrial Floor Machine gives you a *better* floor cleaning job and requires only *one* man. Every trace of encrusted grime and dirt is removed in one operation by a high speed revolving steel wire brush. Packed grease and dirt, embedded metal cuttings—all disappear, leaving a clean, smooth floor.

IT PICKS UP WHILE CLEANING

Centrifugal motion of revolving brush (1725 R.P.M.) hurls metal bits and heavy soilage into built-in hopper while powerful vacuum fan sucks lighter material into bag. This eliminates usual sweep-up work after machine-cleaning. Floors may be cleaned *while plant* is in *operation*.

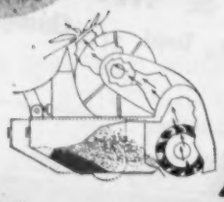
CUTS CLEANING COSTS

Cleaning costs are reduced as much as 50% through the use of the Model K because it "dry cleans" floors. Eliminates the use of harsh chemicals, hand scraping, soap and water. The non-slippery surface produced by the Tennant System makes trucking easy, walking safe.

WRITE or WIRE for further information

G. H. TENNANT COMPANY
2598 North Second Street
Minneapolis 11, Minnesota

16" steel wire brush



The way to finer floors
TENNANT
Floor Maintenance System

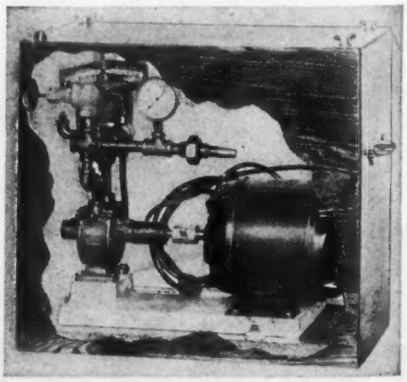
Revolving steel wire brush loosens and hurls heavy soilage into large hopper. Suction fan pulls lighter dirt upward into canvas bag. Leaves floor clean.

tact with each other and the point of contact is heated, there will be a small current generated, the magnitude of which will depend upon the difference in the materials and the temperature to which the contact is heated. If the two materials are identical, there will be no current generated. By placing two samples in contact and heating the contact by passing a current through the pieces, the thermoelectric current generated can be measured.

This unit is manufactured by American Tubular Elevator Co. and is distributed by Dravo Corp., 300 Penn avenue, Pittsburgh 22.

Testing Unit

Leiman Bros. Inc., 145-77 Christie street, Newark 5, N. J., offer a portable vacuum and pressure unit for gas or air, to be used in operating many kinds of apparatus for temporary use or for test purposes. These units will handle from 1 to 5 cubic feet of air at a pressure up to 10 pounds or 20 inches mercury vacuum and any purpose for which air or noncorrosive gas might be used may be accomplished with these light weight units.



They may be equipped with interchangeable motors for various currents. Some are directly connected to motor

UNICHROME*

Alkaline Copper

FOR SMOOTH, SPEEDY PLATING TODAY, AN *"Ace In The Hole"* FOR TOMORROW

FAST PRODUCTION of lustrous deposits — is yours with Unichrome Alkaline Copper. Speed ... smoothness of deposits ... efficiency ... and safety—have all been *proved* in the many large installations. And when you add economy of operation to these benefits, it's apparent why Unichrome Alkaline Copper will pay immediate dividends when it's time to meet post-war competition.

LOOK INTO THESE FEATURES

Unichrome Copper deposits are dense, unusually fine-grained, and adhere well. Their exceptional smoothness makes an excellent base without buffing prior to bright nickel. Where the base metal is rough, the plate can be buffed with minimum pressure.

In many plants today this process boosts production because of the high plating speeds obtained. A quick, simple cleaning cycle is used, and deposits need no activation before plating with other metals.

Due to the moderate bath temperatures, both heat losses and heating needs are lowered. The bath is stable and easily controlled, has a wide operating range, and is replenished at low cost. It's not critically sensitive to impurities, and is less severe on rack coatings. 100% anode and cathode efficiency. The non-toxic solution doesn't attack flesh or equipment. Standard equipment is usually satisfactory.

LEAFLET GIVES ALL THE FACTS

In it you'll find a complete description of Unichrome Alkaline Copper ... characteristics, plating speed tables, important technical data. In writing for your free copy, kindly include a brief outline of your requirements.

OTHER U. C. PRODUCTS AND PROCESSES TO SERVE YOU

CHROMIUM PLATING for wear-resisting, oil-retaining and other types of finishes.

☆**ANOZINC** salts for anodic treatment of zinc giving greatly increased corrosion-resistance.

☆**UNICHROME DIP** for increased corrosion resistance of zinc and cadmium — without electric current.

☆**UNICHROME STRIP** for speedy removal of copper, chromium, zinc, etc.

☆**UNICHROME RACK COATINGS**

☆**UNICHROME STOP-OFF LACQUERS AND COMPOUNDS**

☆**UNICHROME CLEAR LACQUERS**

☆**UCILON**—a corrosion-resistant coating for protecting surfaces against acids, alkalies, water, gasoline and various corrosive chemicals.

☆Trade Mark U. S. Pat. Off.

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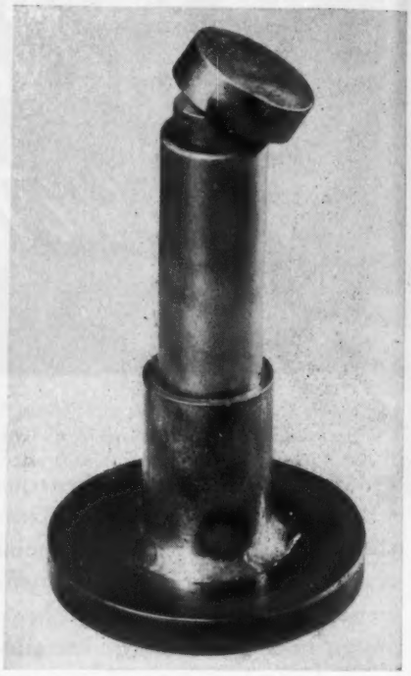
51 East 42nd Street
New York 17, N. Y.
Waterbury 90, Conn. · Detroit 7, Mich.

ROTOBLAST
AIR BLAST
PANGBORN CORPORATION
World's largest manufacturer of Blast Cleaning and Dust Control Equipment HAGERSTOWN, MD.

shaft, others are operated with equally restricted drives in the form of V-belts and grooved pulleys. A carrying case is supplied and there are means of controlling the flow of air to or from the pump and at the same time controlling the degree of pressure or vacuum.

Specimen Holder

A new specimen holder for making Jominy end-quenching hardenability tests is announced by Claude S. Gordon Co., 3000 South Wallace street, Chicago 16. The holder consists of a stainless steel shell with a cap. The specimen



to be tested is put inside the shell and heated in a furnace. After heating, the shell is placed in the base assembly. The pin in the bottom of the base pushes up the specimen causing the cap to fall off. The sample may then be removed with the Jominy tongs and quenched in a Jominy tank. Both the tongs and tanks are made by the company.

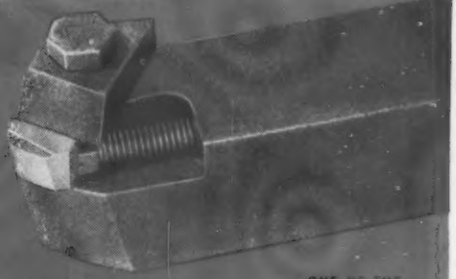
Illuminated Magnifier

Designed to simplify and speed up visual inspection operations, George Scherr Co., 200 Lafayette avenue, New York 12, announces model C Magni-Ray. The unit is encased in a casting of aluminum alloy. The lens, which is 5 inches in diameter, is manufactured of high grade optical glass and gives a clear, undistorted vision of the object under inspection. The housing is fastened to the 16-inch upright rod extending from the base by a universal clamping device which permits swiveling both up and down and sideways. The magnifying device is supported by a triangular 12 x 12 x 12-inch cast iron base.

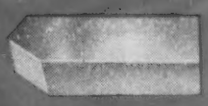
Each model is equipped with two 4 inch long 25 watt tubular bulbs, silvered

IF IT IS YOUR JOB . . . TO TURN OUT SHELLS *on time*

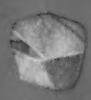
BE GUIDED BY THIS PRODUCTION REPORT



ONE OF THE GANG OF FOUR TOOLS USED



KENNAMETAL TIP WHEN NEW



AFTER FINISH-TURNING OF 5500 105mm SHELLS

KENNAMETAL FINISH-TURNS 5500 105mm SHELLS at Carbide Cost of 1/4¢ per shell

PLACE

One of America's most important shell-turning plants.

JOB

WORK PIECE: 105mm shell, forged steel, heat-treated to Brinell hardness of 370 to 390.

OPERATION: Finish-turning SPEED: 425 SFM

DEPTH OF CUT: .030" FEED: .017"

TOOLS

Gang of four tools, each having clamped-on Kennametal tip, Grade K3H, 3/8" x 1/2" x 1-1/2". Tips are advanced and resharpened until they become too small to clamp (see illustrations above). Chip control obtained by unusual carbide-conserving procedure that will be explained on request.

PERFORMANCE

5500 shells finish-turned during life of set of four Kennametal tips. One operator usually finish-turns about 550 shells per shift. High production rate maintained because tip breakage from operating or grinding strains is negligible.

COST

Tip cost per shell—approximately 1/4c. Amount of Kennametal used in finish-turning one shell—approximately .036 gram.

This shell-turning production report clearly shows that America's metal-working industry has the inherent capacity to meet the requirements of the heavy shell program—provided that effective use is made of Kennametal, the tough, strong, steel-cutting carbide that contains an extremely hard intermetallic compound ($WTiC_2$), found in no other known tool material.

The finish-turning operation on 5500 shells, as described, required only 196 grams of Kennametal—about .036 gram per shell. This is representative of the economies effected on all shell-turning operations wherever Kennametal is used.

It is important to remember that Kennametal performance is predictable, under known conditions of use and maintenance, because its uniformity is precisely maintained by rigid chemical and metallurgical tests at every stage of manufacture.

Our field engineers are fully equipped to help you obtain maximum shell production, with minimum consumption of carbide, through proper application and use of Kennametal tools.

Catalog 44 lists addresses of field offices, and describes Kennametal. A copy is yours for the asking.

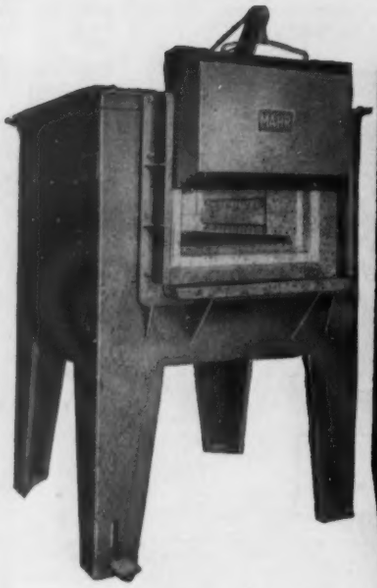
KENNAMETAL

SUPERIOR CEMENTED CARBIDES

TRADE MARK REG. U. S. PAT. OFF.

KENNAMETAL Inc., LATROBE, PA.

WAREHOUSES IN: CHICAGO · DETROIT · PHILADELPHIA NEW YORK SAN FRANCISCO



1. Hardening carbon and alloy steels below 2000°F
2. Tempering or drawing heat treated parts
3. Annealing and normalizing
4. Pre-heating high speed steels.
5. Experimental and development work

ALL THESE USES FOR

MAHR BOX TYPE Electric FURNACES

Let's look first at the heart of the furnace—the heating elements. MAHR ELEMENTS are specially designed by us for fast heat up and maintenance of uniform temperature. They are 80% nickel and 20% chrome with a watt density of not over 10 watts per square inch. Mounted where they are easily replaceable. TERMINALS have three times the cross sectional area of the resistors, and are securely clamped to solderless connectors within a ventilated housing.

Without "dressing it up" with excess gadgets, we've put into this MAHR Electric Furnace everything necessary to meet the most rigid durability and performance requirements. SHELL is reinforced steel plate, and carefully insulated for low current consumption. The DOOR needs no sand seal because it's wedged on all sides. HEARTH PLATE is cast nickel-chrome alloy with upturned flanges. For sizes and specifications, write for our data chart.

Electric POT Furnaces

Suitable for all molten bath heat treating operations. Can be operated continuously at 1650°F. Elements easily replaced. Thoroughly insulated. Easy operating two-piece door with handle in each piece.

WRITE for BULLETINS on Other MAHR PRODUCTS

Electric gas and oil fired ovens and furnaces in car bottom, conveyor and other types for every heat treating operation. Safety Vacuum Torches, Rivet Heaters, Forging Furnaces, Burners, Heaters, Blowers, Fans.

Complete Engineering Service

MAHR

ENGINEERS • DESIGNERS • MANUFACTURERS ALL EQUIPMENT FOR METAL HEATING

MAHR MANUFACTURING CO.

DIVISION OF DIAMOND IRON WORKS, INC.

1702 North 2nd St., Minneapolis 11, Minn.

so that the light is reflected directly upon the work without any loss of power. The base is covered with a deep green background to avoid eyestrain. It is designed for use on large castings for the detection of cracks, imperfections and blow holes.

Heating Torch

A new medium-weight heating torch is announced by Air Reduction Sales Co., 60 East Forty-second street, New York. Style 9802 is designed for concentrated localized heating such as is required for bending, straightening and shrinking of steel plate as well as for silver-brazing of heavy copper plate in the manufacture of copper pipe.

Five new multi-flame acetylene heating tips as well as two multi-flame propane heating tips are available for this torch. These seven tips will meet the requirements of every heavy heating job. Three mixers are available for the torch —for positive pressure acetylene, low pressure acetylene and for propane. The available extensions include a 12-inch straight extension and 18, 24 and 42 annular extensions.

Punch Press

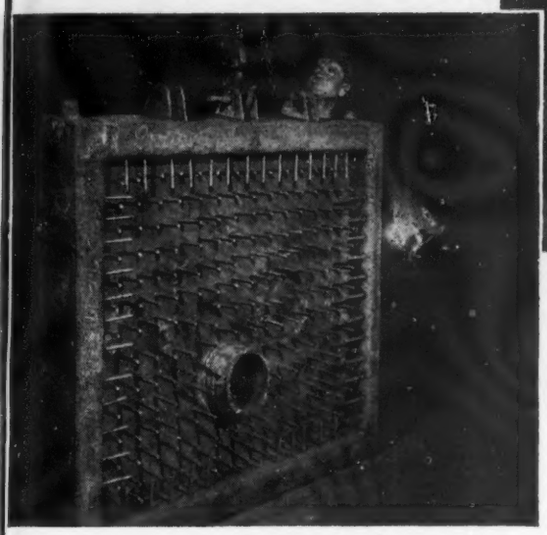
Combining the features of the V-way vise and the gap style press, Reimuller Brothers Co., 9400 Belmont avenue, Franklin Park, Ill., now offer a new precision bench press of semi-steel construction. Incorporating V-ways to eliminate the use of die shoes, the new press is designed for a more efficient handling of production jobs. It is made in the 5-ton size and has a 5 x 6 inch platen with 7 inches of ram movement.

Two levers are used in the hydraulic foot control, one to apply pressure up to the rated tonnage; the other for release which has a two speed return. No outside airlines or source of power is

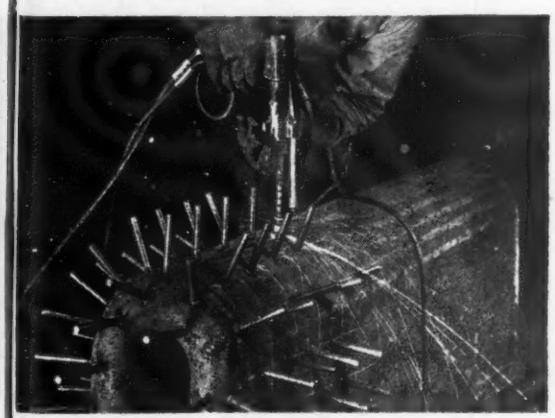
Photographs by courtesy of Inland Steel Company

Stud welded to Open-Hearth Door in ½ second!

The Nelson Stud Welder *automatically* end-welds studs to metal. Photo at Inland Steel shows stud welding of a hearth door before installing refractory ore.



Complete fusion of studs to metal results from flux-filled studs, automatic timing control, and a full-shielding of the arc.



Stud welding water-cooled Dog House. Studs are easily and accurately located.

To increase the life of hearth doors—to cut repair time—leading steel producers like Inland Steel are using Nelson Stud Welders. Doors are lasting as long as 150 heats. Studs are rapidly installed . . . are as strong as any hand stud welding application.

Thousands of stud welders are now being used by more than 500 shipyards and industrial plants. No welding experience necessary . . . Saves time, material, and labor.

For catalog, and report on "Stud Welding Hearth Doors", write:

NELSON SPECIALTY WELDING EQUIPMENT CORP.
Dept. T, 440 Peralta Ave., San Leandro, Calif.

Eastern Representative:
Camden Stud Welding Corp., Dept. 122, 1416 So. 6th St., Camden, N. J.

NELSON STUD WELDERS

CCC

A REDISTRIBUTION SERVICE

THE Commodity Clearance Company is a private undertaking organized to provide a permanent redistribution-service for private industry. We are prepared to list surplus inventories of such material as steel, aluminum, copper and copper-base alloys, in mill form; chemicals; textiles; machine tools and other equipment, both new and used.

Representative items of all surplus materials and equipment recorded with us are published in the CCC MARKETER, a semi-monthly publication similar in format to the former WPB Redistributor. The CCC MARKETER is available without charge to any responsible user of such surpluses.

Full information regarding our service will be forwarded, without obligation, to reliable concerns interested in locating or disposing of surplus inventories.

CCC

COMMODITY CLEARANCE COMPANY

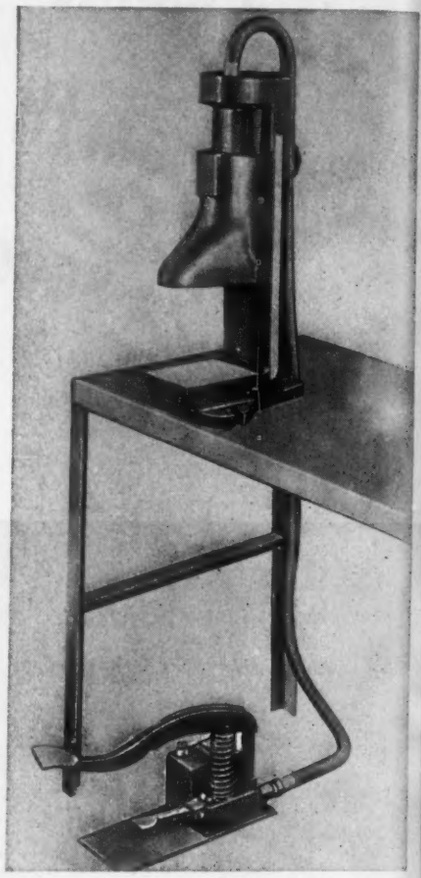
212-222 Rose Building

CLEVELAND 15, OHIO

Telephone MAin 1956

needed and the unit is self-air eliminating.

The press is portable when mounted on a portable stand. The machine is adaptable with proper equipment to be used as a tensile and compression testing unit up to 5 tons and as a pipe vise to



handle up to 6 inch pipe, or as a shear for ¼-inch plate or ½-inch rounds. Other uses to which the unit can be adapted are marking, notching, riveting, crimping and mounting samples.

Vertical Drillers

Fixtures of the new vertical drillers are designed to take a cluster gear requiring the drilling of a 1 35/64-inch diameter hole 4-inches long and can also be adapted to a larger cluster gear which require a larger diameter hole 7 inches long. The machine is provided with speed and feed change gears.

It is of the nonindexing type. Finished pieces are removed after the machine has completed a rotation. Feed of spindles and travel of machine are automatic. The unit is manufactured by Davis & Thompson Co., 6411 West Burnham street, Milwaukee.

Welding Outfit

For welding purposes on overhead cranes and other difficult plates, Lintern Corp., 60 Lincoln avenue, Berea, O., has developed a portable welding outfit. It can be used for at least 12 hours of continuous welding on light gage metal. It

Something to do about tomorrow—TODAY

Your responsibility doesn't *stop* with maximum war production. As a business man, you are a vital unit in the U. S. plan for economic reconversion. Don't wait for the "V" day whistles to wake you up.

Post-war America must market annually 140 billion dollars worth of goods and services—over 50% more than in any pre-war year. But our enlarged production facilities that make this *necessary* also make it possible to capture *quickly* product hungry markets of the world—as well as tap our own accumulated needs and savings.

Here are the makings of those 55,000,000 peacetime jobs. Here is the guarantee against run-away deflation.

YOU MUST BE READY . . . (1) Make a reasonable estimate of your needs to begin post-war business. (2) Place orders *now* for this material, to be delivered as soon as W.P.B. permits. (3) Advise your customers to do the same. (4) Keep up-to-date on governmental rulings.

With all manufacturers doing this, the transition period will be shortened and depression trends stopped . . . *Because* this plan permits suppliers to anticipate *your* needs and begin production on them at an earlier date. It gives *you* a back-log of orders to start you off and assures your quick return to civilian business.

If you desire reprints of this advertisement without the Heppenstall name, mail your request to Heppenstall Co., Pittsburgh 1, Pennsylvania.

HEPPENSTALL, the most dependable name in forgings

Learn how versatile and economical your printmaking equipment is...

(Just make two comparisons)

1. Compare your versatility when ordering prints with that of the OZALID user.

With Ozalid, you specify any one of a variety of types:

OZALID Work Prints
- **Black-line**
- **Blue-line**
- **Red-line**
- **Black-line opaque cloth**

Only Ozalid gives you a print for every purpose, allowing you to do such efficient things as to assign identifying colors (black, red, blue) to prints of different departments, to distinguish checked from unchecked prints, etc.

OZALID Intermediates
- **Black-line**
- **Sepia-line**
- **Foils**
- **Tracing Cloth**

Only Ozalid gives you a full line of intermediates which may be (A) substituted for valuable original tracings in subsequent print production (B) readily altered when design changes are necessary (C) employed to make composite prints or to reclaim soiled originals.

In addition, Ozalid gives you DRYPHOTO—the new paper which produces beautiful reproductions, complete with half-tone detail, from film-positives of any photographic subject or perspective drawing.

2. Compare the methods you now employ to make prints . . . with OZALID "Simplified Printmaking."

With an Ozalid machine you produce all prints in the same manner. Only two steps—Exposure and Dry Development . . . and in seconds your prints are delivered dry, ready for immediate use. No "leaders" are used . . . and you can process cut sheets as well as roll stock, eliminating trimming waste.

Some more Ozalid features you'll appreciate

Anyone can be trained quickly to operate an Ozalid machine at top efficiency...operating and maintenance costs are low...design is so compact that for convenience sake, you may want to install your Ozalid machine in a corner of the drafting room or office.

Write for "Simplified Printmaking" today

It explains OZALID in detail; contains samples of prints; shows how inexpensive it is to adopt; and how you can use it in all departments.

ARMY E NAVY

OZALID

DIVISION OF GENERAL ANILINE AND FILM CORPORATION • JOHNSON CITY, N. Y.

OZALID IN CANADA—HUGHES-OWENS CO., LTD., MONTREAL

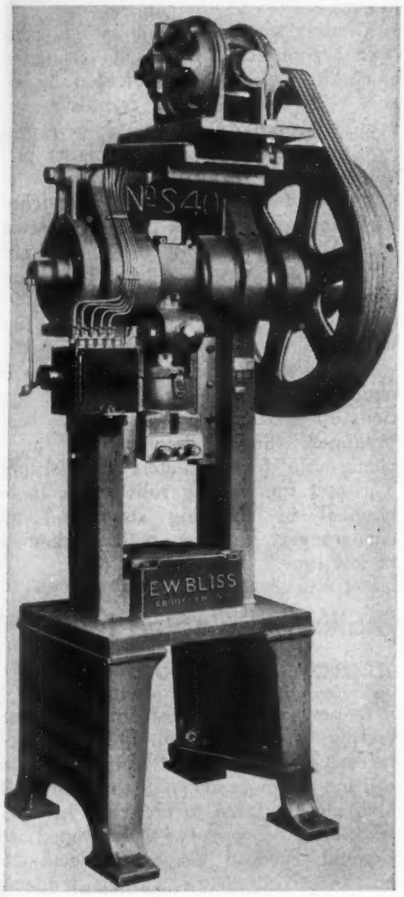
utilizes a Prestolite tank and a small oxygen tank.

The outfit consists of an oxygen cylinder, torch, cutting attachment, yoke, cutting tip, welding tip, pig tail, wrench, No. 1620 gage, oxygen hose, acetylene hose, pair of goggles, Halide leak detector and a 10-pound pressure regulator for B tank. The equipment is arranged in a steel cabinet painted with rustproof enamel. With this outfit it is possible to weld or braze up to ⅜-inch plate with the tips furnished. The cutting attachment handles up to ½-inch plate.

Power Press

Designed for requirements peculiar to the lock manufacturing industry, a new mechanical power press has been developed by E. W. Bliss Co., Fifty-third street and Second avenue, Brooklyn 32, N. Y. It has a compact frame of rugged construction for standing loads beyond the rated capacity of the press, with a die space and operating area concentrated for specialty dies.

The press is equipped with a semiautomatic lubricating system to the essential



bearings. The operating speed is about 125 strokes per minute; however more production can be obtained by attaching single or double roll feeds to the press. Operation of the feed can be front to back or back to front. The press is rated at 40 tons capacity at bottom stroke.

A helical-type driven gear on the main spindle of the Gisholt Simplimatic — famous high-speed, high-production automatic lathe — is made of Ampco Metal.

M-12

Protection against costly metal failures:

Machine tool parts of wear-resisting

AMPCO METAL

provide controlled hardness; high tensile strength; stubborn resistance to wear, impact, fatigue

Leading machine tool builders (over 90 of them) protect you against breakdowns at vital frictional points by using parts of Ampco Metal — a *series* of aluminum bronze alloys tailor-made to severe operating requirements.

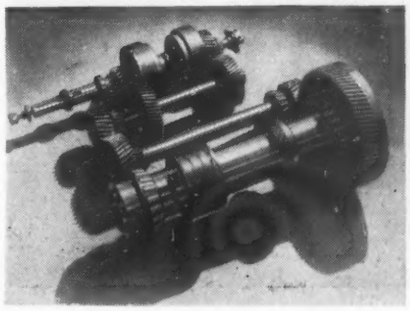
The controlled physical properties — varying from ductile and soft to rigid and hard, but having in common two prime characteristics: high strength and unsurpassed resistance to wear — give Ampco Metal several times the life of ordinary bronzes.

Check for parts of Ampco Metal, as a mark of quality in the machines you buy. And replace worn parts of your older machines with durable Ampco.

Send for "File 41 — Engineering Data Sheets." Use the coupon below.

AMPCO Metal
The Metal without an Equal

Below: Close-up of the Gisholt Simplimatic headstock transmission showing the helical-type driven gear (large one) made of Ampco Metal.



Tear out and mail today!

AMPCO METAL, INC.
Dept. S-3, Milwaukee 4, Wisconsin

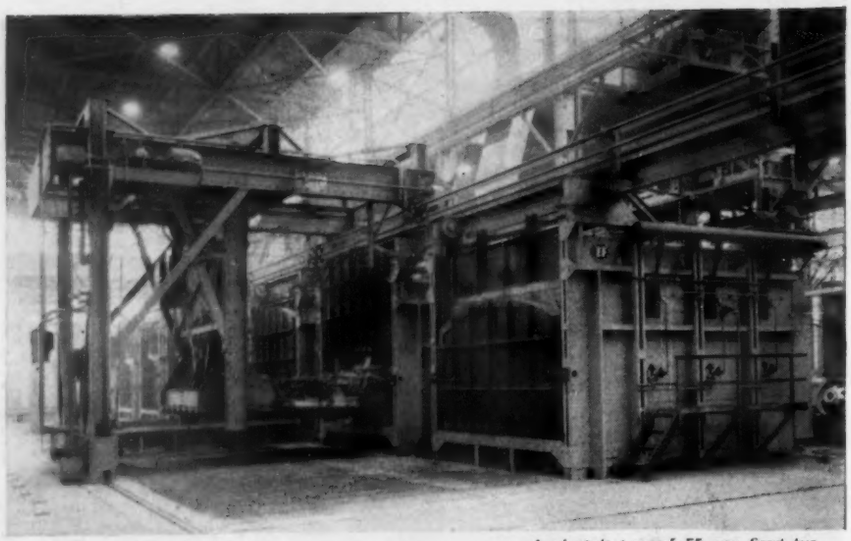
Send me, without obligation, "File 41 — Engineering Data Sheets."

Name..... Position.....

Company.....

Address..... ☐ Home ☐ Business

City..... (.....) State.....



An installation of EF gas fired furnaces with quench and gantry crane for various annealing and heat treating cycles on large parts and products.

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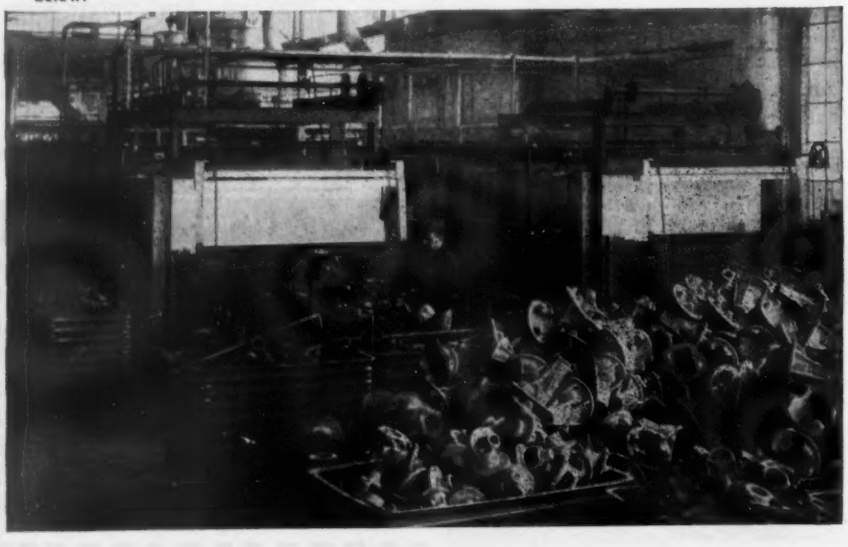
Scale-free, uniformly annealed castings are discharged continuously from the EF special atmosphere furnaces shown below.



Welding Light Gage Steel

(*Concluded from Page* 105)

tainable. A desirable type of welding head is one where an independent control may be obtained on voltage, amperage and wire feed. This subject is controversial but higher speeds and better control of the weld bead are experienced with some heads than others. Degreasing while not mandatory is desirable for higher speeds and perfect work. Trichlorethylene has been preferred to flame or chemical cleaning. Different fluxes or melts yield resistance to pinholing and conditions caused by oil, water, or moisture. The size of the flux or melt and its melting point are also important factors. Speeds and quality that may be obtained by the use of a flux of one granulation and melting point may not yield as satisfactory results on other speeds and conditions.

The above refers to work done by submerged melt processes on mild steel. Experimental work has been done however on the use of submerged melt processes for alloy steels, stainless, nickel alloys, aluminum and magnesium, which indicates that the field for this fixture and processes may be greatly extended. Work has been accomplished on these fixtures on mild steel by using multiple jet gas welding.

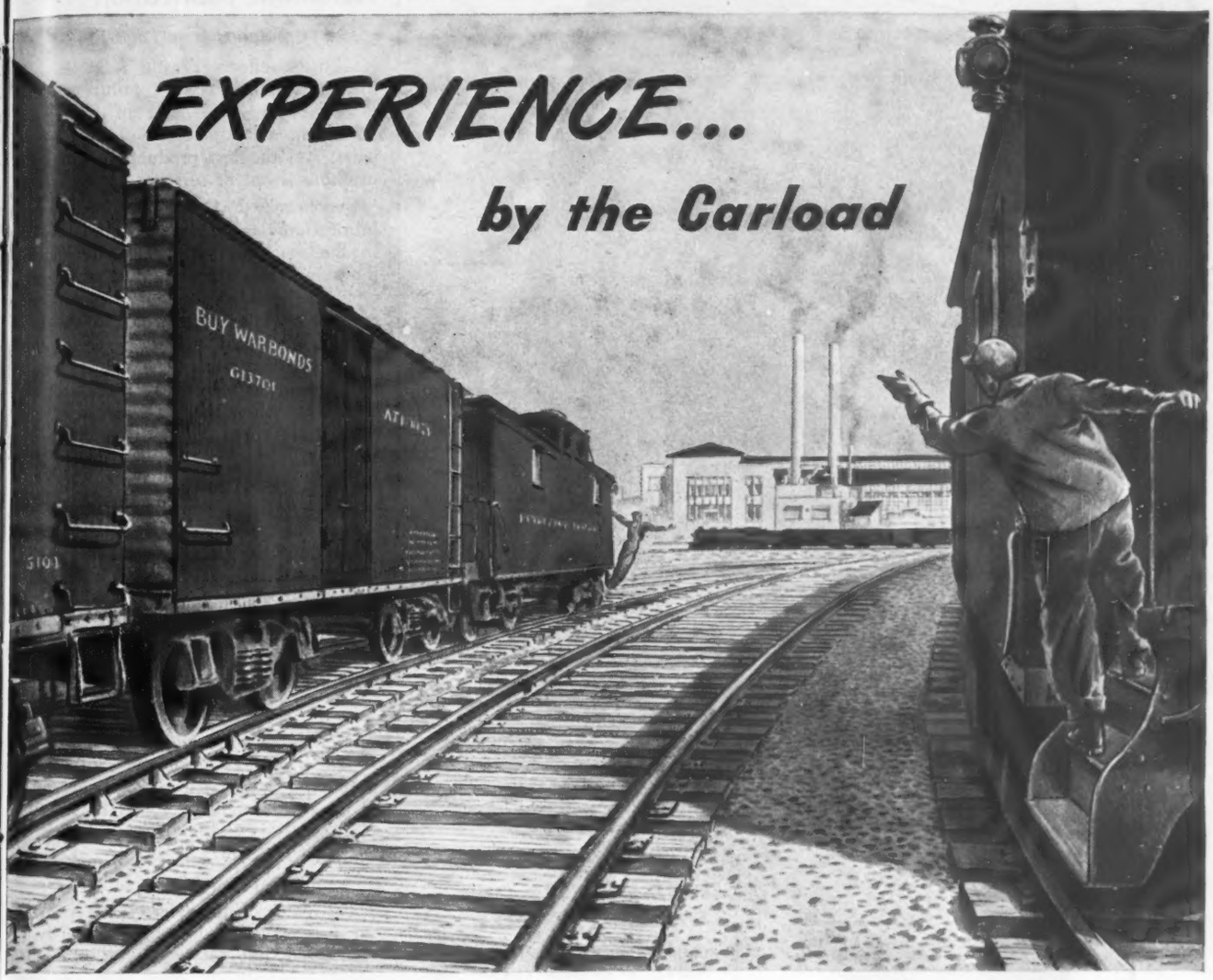
Aluminum and magnesium welding has been accomplished by using a tungsten electrode with the arc shielded by argon. The fixtures and processes recommend themselves to the low capital investment required and low labor production costs. The scope of the use of this type of fixture has not been scratched for war usage and the field for postwar work is only limited by the imagination. While ⅛-inch wire has been principally used on gages from 10 to 16, smaller gages seem to weld to better advantage with smaller diameter wire.

Increased welding speeds are again obtained as lighter gages are used. Sections up to 19 feet in length have been produced. Some fixtures are interchangeable for diameters and shapes. The cost for forming rolls seems to be nominal in changing sizes and the changes may be made with a minimum of lost time.

Stalling Eliminated by Improved Solenoid Unit

A new solenoid mechanism for operating 500,000-kilovolt-ampere magneblast circuit breaker features a flux-shifting closing solenoid to produce a high closing force to close against high short-circuit currents. Developed by General Electric Co., Schenectady 5, N. Y., it eliminates stalling tendency by shifting its flux path during closing stroke to increase its force when contacts touch. Mechanism is claimed to be capable of closing and latching currents in excess of 80,000 amperes without stalling. Instantaneous tripping relays required with conventional solenoid mechanisms are not required.

Number 8 of a Series: "Looking at the 5 essential things you never see in electrodes!"



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COUNTERBORES • LATHE CENTERS • BORING TOOLS
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Automatic Lubrication

(*Continued from Page* 114)

lubrication effects drastic reductions in the number of bearing failures. This saves not only the cost of the repair parts, but also the labor of making repairs, and the lost production while the machine is out of service.

Synchronized Operation: Automatic lubrication ties lubrication intimately into the machine's operation, by driving the pump from a moving part of the machine being lubricated, or with an electric motor interconnected into the machine's electrical system. The pump starts feeding fresh clean lubricant to the bearings as soon as the machine starts and stops when the machine stops.

Minimized Human Factor: The oiler can't "miss" a machine. The pump keeps right on pumping as long as the machine is running. Consequently, the human factor is reduced simply to replenishing the grease reserve from time to time as necessary.

Automatic lubrication was introduced first in the steel industry. It was here that some of the largest bearings were to be found, and the need for positive fully automatic lubrication was most pressing. But now, most all industries appreciate the many savings that are procured with automatic lubrication, with the result that it is now being widely used on machines of all kinds.

There are many case histories of the savings automatic lubrication makes possible. Typical examples include:

Crushers: The water-cooled bearings on a heavy duty crusher were being lubricated, but not satisfactorily, with a hand "centralized" system. The engineers decided to substitute Trabon automatic lubrication. This system has done such a thoroughly satisfactory job of lubricating the bearings, that the water-cooling was eliminated, and the crusher is still able to handle very heavy loads without overheating.

Steel Mill Tables: The entering and delivering tables on an old blooming mill had a total of 21 rolls running in brass bearings, lubricated with pressure fittings and a hand gun. To meet the demand for increased steel resulting from the war, the mill was called upon to operate 24 hours a day, 7 days a week.

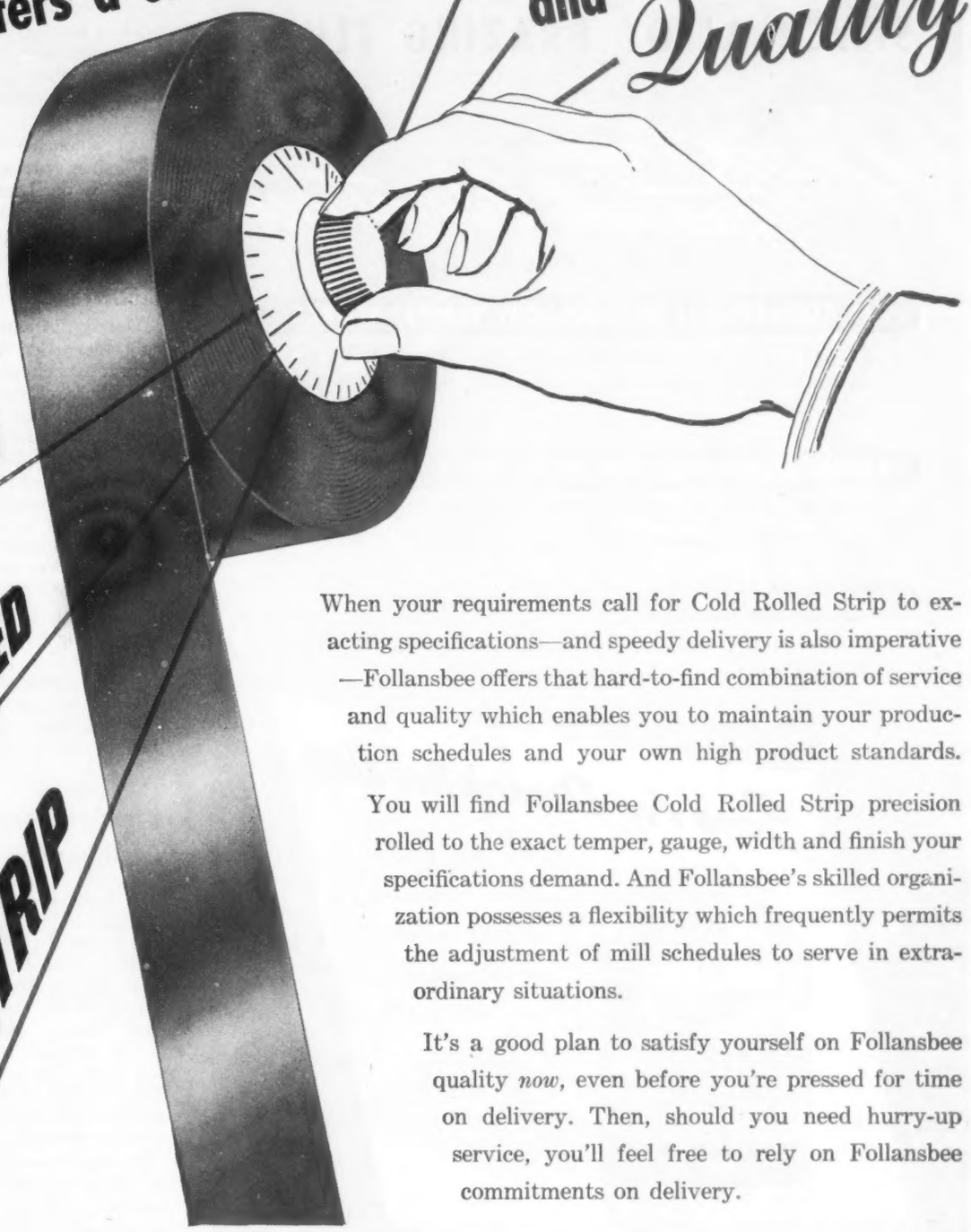
The roll bearings could not stand the pace and it was necessary to shut the mill down every Sunday to repair an average of four bearings on the tables. This maintenance work required 6 or 7 hours time of five men, and also the use of an overhead traveling crane for approximately an hour and a half.

The operating and maintenance departments finally decided to put a Trabon automatic lubricating system on the mill tables, delivering a small quantity of grease to each roll bearing every 18 minutes. This system has kept the bearings well lubricated, notwithstanding the heat and the pounding of the heavy blooms.

During the 18 months that have

Follansbee

offers a combination of *Service* and *Quality*



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When your requirements call for Cold Rolled Strip to exacting specifications—and speedy delivery is also imperative—Follansbee offers that hard-to-find combination of service and quality which enables you to maintain your production schedules and your own high product standards.

You will find Follansbee Cold Rolled Strip precision rolled to the exact temper, gauge, width and finish your specifications demand. And Follansbee's skilled organization possesses a flexibility which frequently permits the adjustment of mill schedules to serve in extraordinary situations.

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POLISHED BLUE SHEETS • ELECTRICAL SHEETS & STRIP • SEAMLESS TERNE ROLL ROOFING

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We will gladly send you full descriptive and application data on SCAIFLUX.

SCAIFE

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Founded 1802

OAKMONT (Pittsburgh District), Penna.

elapsed since this system was installed, there has been no shutdown on Sunday at all. The installation repaid its entire cost—from maintenance alone—in 18 weeks.

Metal Lath Machine: This machine has 48 small roller bearings, many of which were subject to shock loads resulting from the handling of cold metal. The machine was regularly piling up 15 hours down-time a month for replacement of bearings resulting from improper lubrication, part of which was traceable to over lubrication, and the resulting friction and overheating of the roller bearings.

An automatic system, designed like all Trabon systems to provide each bearing with small amounts of lubricant at frequent intervals, instead of large amounts at infrequent intervals, was installed on the machine. This system has now been in use for more than 2 years.

During this entire time there has been only one period of down-time traceable to bearing failure, and this resulted from the failure of the operator to notice a break in the line leading from the feeder to the bearing, rather than from a failure of the lubricating system itself. The system not only saves the cost of buying replacement bearings, but also the labor of making the repairs, and, as is so frequently more important, the lost production while the machine is out of service.

Power: In a large seamless tube mill, the piercing buggy traveled 30 feet over slides that were approximately 3 feet off the floor. After an automatic lubrication system was installed on the slides, the power saving—according to the customer's own report—was 55 per cent.

Booklet Describes Safety Clothing for Welders

A booklet describing safety clothing for male welders is available from American Optical Co., Southbridge, Mass. Clothing described includes overalls, all-leather pants, hot weather pants, chaps, aprons, coats, cape sleeves and bib, short jacket, sleeves and sleevelets, gloves, mittens and spats. Clothing is said to provide overall protection against flying sparks, which helps to prevent painful skin burns and tends to reduce accident frequency.

Patterns were developed by a designer of men's clothes, working in conjunction with an experienced welder. Sleeves and trouser legs are shaped to fit. Garments are made of as few pieces of leather as possible without unnecessary piecing and useless seams.

Also, there is no excess leather at the fold of the arm, at the shoulder, or around the neck to form "pockets" for catching sparks. Emphasis is laid on comfort, flexibility, maximum protection, and resistance to long, hard service in these garments.

Bending and forming a bead in flat pieces of dural for fuel tanks on No. 4 Bulldozer in an Aircraft Factory.

Truck braces made in three operations of .40 carbon steel 2 x 3 inch cross section bent to 5½ inch inside radius on No. 6 Bulldozer.

BULLDOZERS SPEED HEAVY METAL FORMING

For many classes of work where tremendous force is required in the fabrication of metal parts, Cleveland Steelweld Bulldozers have proven of advantage. They are ideal for forming operations in aircraft plants, shipyards, railroad, structural and forge shops.

Heavily built throughout, Steelweld Bulldozers are provided with all features necessary for long-life trouble-free service. Evidence of their quality construction is the splendid record of the machines since the first one was built in 1930.

A complete line of Cleveland Steelweld Bulldozers is available. Quotation and detailed specifications will be furnished upon request.

If you are looking for ways of effecting production economies, you will be interested in these versatile machines. Descriptive literature will be gladly sent.

Forming gear rims from 3 x 8 inch high-carbon steel bars on No. 8 Bull-dozer. This machine has bending capacity of 220 tons.

THE CLEVELAND CRANE & ENGINEERING CO.
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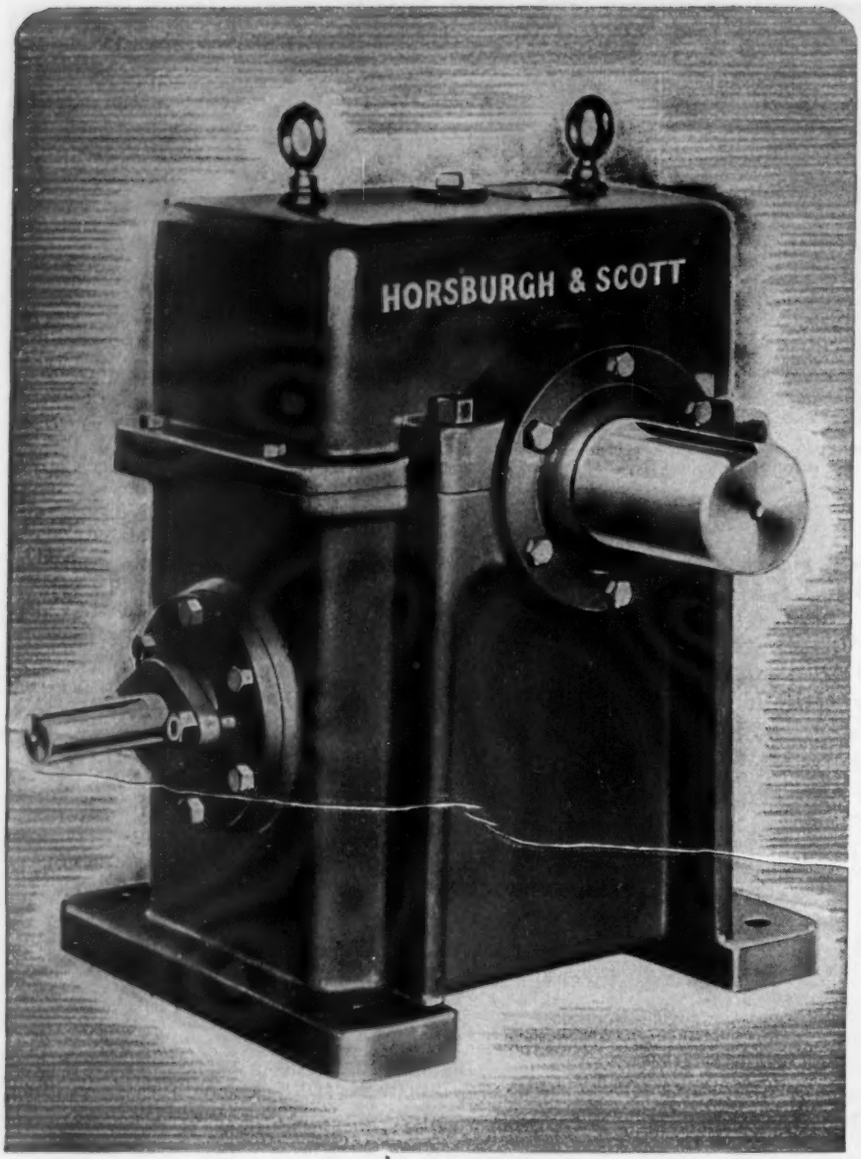

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THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

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Induction Heating

(*Continued from Page* 116)

allurgical ideal." We have demonstrated that, so far, the vacuum tube unit only can actually meet the requirements of really thin case hardening. As used in this paper, the phrase "thin case hardening" may be defined as the surface hardening of cases in the order of 0.0001-inch thick on the surface of hardenable steel parts by the use of heat only and without scaling, warping or destruction of previous heat-treat benefits developed in the metal just beneath the hardened surface. The principal objections to spark gap equipment came from the fact that the power output of the device was always dependent upon the condition of the spark gap. Cleaning and readjustment of the spark gaps was required at intervals ranging from a few hours to a few days, depending upon the extent of use of the gaps.

Variation of output power is satisfactory only where heat-treating time is appreciable and human judgment can compensate for the output variation.

The need for megacycle energy heating became forcefully evident with the advent of lightweight aircraft engine parts and numerous other manufactured items requiring precise and thin surface hardening with no hazard to the structure and properties of the underlying metal.

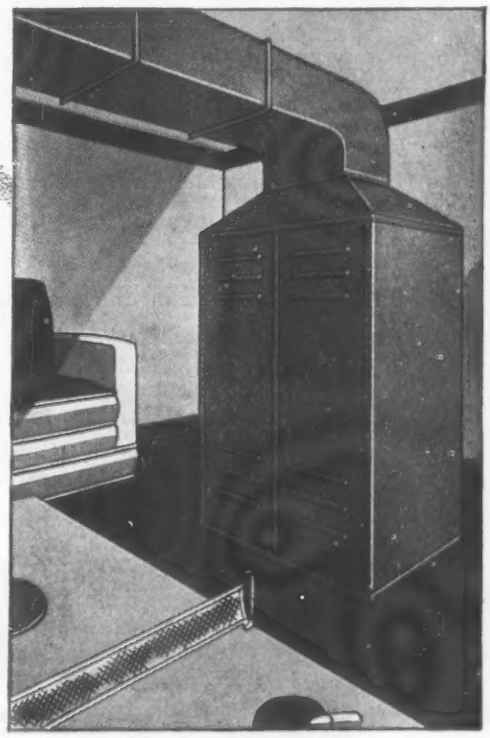
Two Thermal Methods Used

It must be kept in mind that there are two thermal methods for securing a hardened case by induction heating, and it is necessary to distinguish between them. Under the first process—the slow speed, low frequency method using 30 or more seconds' heating time—quenching can be achieved only by rapidly absorbing the heat from the surface by an external coolant. Two distinct thermal actions enter into the hardening process when this method is used. First, rapid quenching is obtained and a low temperature is maintained at the surface by continuous application of the coolant but, secondly, the metal directly beneath the surface continues for an appreciable time to receive replacement heat at approximately the same rate as it is releasing heat to the surface layer and thence into the coolant. Therefore the depth of the resultant hardened case is determined not by the condition of heating, but rather by the condition of cooling. Since this of necessity involves the geometry and mass of the treated part, over which factors the operator has no control, the case is frequently uneven in its internal contour and of an undesirable depth; and the metallurgical properties of the pretreated core are usually altered by the excessive amount of heat experienced during the long process.

With the second method, which is associated with high power megacycle heat at a frequency of 2,000,000 to 15,000,000 cycles per second, the quench is achieved by the rapid flow of heat inward from the heated surface layer

BONDERIZED
ZINC COATED
SHEET STEEL

A NEW TYPE OF MILL TREATED SHEET



Bonderized, zinc coated sheet steel provides the ideal material for furnace housing and air ducts. It has the rust resistance and paint holding qualities necessary for this type of construction. It resists the humidity of air conditioning, assures continued fine appearance of the enamel finish—and appearance is an important sales factor.

The Bonderized, zinc coated sheet as supplied by steel mills is an interesting new product for users of sheet or strip steel. The coating aids drawing qualities, as well as adding rust resistance and an excellent base for paint. This is a thoroughly workable sheet for practically all forms of fabrication that adds acceptance, color and sales appeal to your product.

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PARKER PRODUCTS CONQUER RUST

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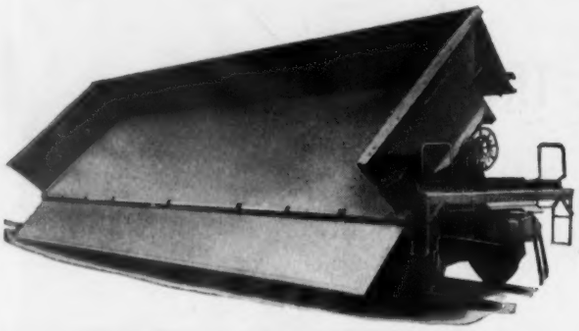

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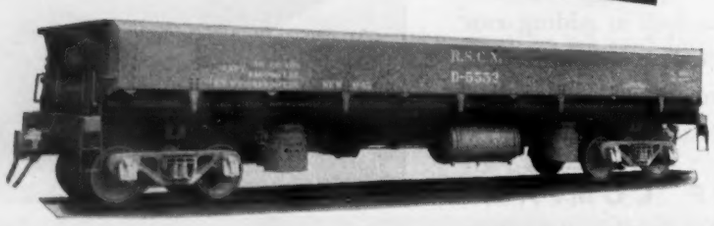
Descriptive, technical bulletins, covering all types of haulage equipment available on request.



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into the cold core. The surface layer only is heated to the treating temperature and quenching is automatically and almost instantaneously accomplished. No appreciable amount of surface heat can be conducted into the core because the energy is developed in as little as one second or less and is concentrated in a very thin surface layer of metal. Thus the hardened case depth is determined by the condition of heating only, and it is not dependent n the geometry of the part. Equally important is the fact that any desired case hardened depth from 0.003 to 0.060-inch in perfectly uniform internal and external contour can be had at the will of the operator.

Advantages of Megacycle Heat Treatment: Since the heat treatment is accomplished in one second or less, scaling is avoided even in ordinary atmosphere. The degree of tempering of the metal layer adjacent to the desired thin hardened case is a function of time and temperature. With lower frequencies the longer heating time allows the heat to penetrate too deeply into the core.

When the case depth is not uniform, distortion is likely to occur. The amount of distortion experienced with megacycle heat treatment has nearly always been negligible. Not only does the uniform section of the case result in a uniform stress, but this stress is small because the hardened layer is thin. By preventing the spread of the surface heat into the core, the bulk of the part remains unchanged and capable of maintaining the original dimensions. For small steel parts and thin walled parts, it is essential that a frequency in the order of 2,000,000 to 15,000,000 cycles per second be used. Smaller heating coils as well as less critical spacing between the coils and the work piece is another highly practical consequence of megacycle heat.

Cost of megacycle heat-treatment is in no way dependent upon the frequency used, but rather upon the efficiency of the frequency conversion means. Efficiency of conversion with vacuum tubes can be as high or higher than that of lower frequency sources. Depending upon the efficiency of the frequency converter, the heat treating energy may cost from 1.5 to 3 cents per kilowatt hour as compared with the base cost of 1 cent per kilowatt hour for the commercial 60-cycle energy. The ultimate production costs are determined, however, by the degree of accuracy with which the heating energy is controlled.

In one application, for example, an area of 50 square inches was hardened to a depth of 0.020-inch for each 1 square inch naturally increases with the depth of the case, and therefore for economy of operation it is desirable to restrict case depth to only slightly more than allowable wear of the part. Had it been necessary to heat the part mentioned to a depth of 0.2-inch in order to obtain a case of 0.02-inch, the cost would have been multiplied by ten and 90 per cent of the power wasted.

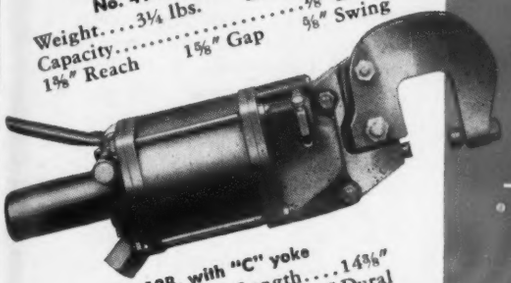
The amount of electric energy applied

CLECO SQUEEZE RIVETERS

the right model for every job!

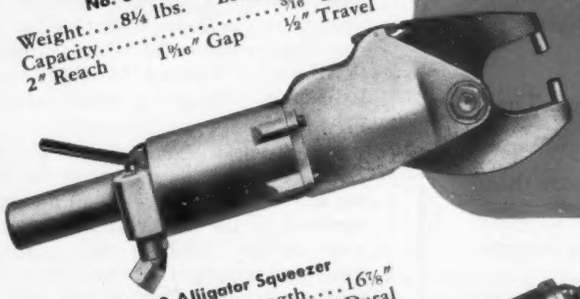
No. 41C, with Plunger through 9/16" yoke
Weight....4⅞ lbs. Length....9 15/16"
Capacity.....1/8" Dural
1½" Reach 1⅛" Gap ½" Travel

No. 41 Alligator Squeezer.
Weight....3¼ lbs. Length....9⅛"
Capacity.....⅛" Dural
1⅝" Reach 1⅝" Gap ⅝" Swing



No. 13B, with "C" yoke
Weight....9 lbs. Length....14⅜"
Capacity.....3/16" Dural
2" Reach 1 9/16" Gap 11/16" Travel

No. 81C, with "C" yoke
Weight....8¼ lbs. Length....14⅝"
Capacity.....3/16" Dural
2" Reach 1 9/16" Gap ½" Travel



No. 82-2 Alligator Squeezer
Weight....7½ lbs. Length....16⅞"
Capacity.....3/16" Dural
2" Reach 1¾" Gap ⅝" Swing

No. 14A-5 Alligator Squeezer
Weight..20 lbs. Length..18¾"
Capacity.....3/16" Dural
5" Reach 2⅛" Gap 1¼" Swing

The complete Cleco line includes every type used in general aircraft manufacture —"alligator jaw", "C" yoke, "one-shot" and "blind" riveters are all available. These light powerful tools are fast and effective; they drive tight rivets with uniform heads, without causing distortion in the surrounding metal.

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IN ADDITION to this unique 3-ply backing, there's one more thing that gives Weldisks exceptional stamina. It's the grit itself – made from electric furnace treated aluminum oxide, hardest, longest-lasting abrasive in commercial use.

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per unit surface must be considerably greater than the rate of heat loss by conduction. Satisfactory results have been obtained in practical applications with values of between 10 and 15 kilowatts per square inch. No particular frequency is necessarily the best. There are available for induction heating 10, 30, 300, 450 kilocycles, and 2, 5, 15 and 30 megacycles, including motor generators, spark gap and vacuum tube units. Best performance depends largely upon the results desired. Thus case hardening has thus far been possible only with megacycle energy.

Applications: Practical applications of megacycle induction surface hardening have been made on various types of surfaces and on a number of types of steel. Flat surfaces with or without a closed loop of work have been successfully treated, demonstrating conclusively that no closed loop was necessary in order to get surface hardening with megacycle induction heating. Both types of flat surfaces were self-quenched after heating with megacycle energy for one second. When the power was cut off, the heated surface was instantly quenched by the cold mass of core material beneath it.

In another typical case both bearing surfaces of a certain partially hollow shaft were hardened to a depth of 0.020-inch with a 1-second heat treatment. The shaft was automatically tripped into a water quench at the end of the heating period and a hardness of 88 rockwell 15 N or 55 rockwell C was developed. The upper bearing of this shaft was treated in such a way that the hardened layer tapered away to zero, as it approached the spline, to avoid hardness in the spline teeth.

Examination of the lower bearing cross section clearly showed that the hardened case, which was 0.009-inch deep and required a 0.7-second heat treatment had a perfectly uniform case depth. It was found also that the case was under compression which, according to Almen of General Motors Research Laboratory, will give a much better fatigue life.

Metallurgical examination of the same surface of the cross section of the bearing at 100X shows clearly that no change occurred in the core material beyond a very narrow transition zone. In this zone, the measured hardness was intermediate between that of the case and the core, but never was it less than that of the core which was 35 rockwell C from a prior heat treatment.

A bearing cross section identical to the one mentioned above except that the hardened case thickness was 0.020-inch was formed on a partially hollow shaft, with an outside diameter of ⅝-inch and a wall thickness in the hollow portion of ⅛-inch. The case thickness was found uniform over both the hollow and solid portions.

A navy sextant gear of approximately 3-inch outside diameter by 0.020-inch thick, made of SAE-1090 steel was surface-heated to 1600 degrees Fahr. with 12 kilowatts of energy in 0.7-second

Photo courtesy Lockheed Aircraft Corp.

STROKE OF *Lightning* IN THE SKY

...RIDING ON LUNGS OF SPECIAL ALLOY STEEL

FOR the superior high-altitude performance of the Lightning and other first-line American warplanes, give primary credit to their engine "lungs" —the GE Turbo-Supercharger—a milestone in research and design, and a triumph in metallurgy and production.

Allegheny Ludlum collaborated on turbo-supercharger research for years before the war. Our chief contribution was the development of a commercial technique to centrifugally cast the supercharger diaphragm—an intricate shape which was formerly laboriously fabricated by welding. This casting, made of a highly complex alloy steel which maintains its strength at red-hot temperatures, was much stronger, more durable and more efficient than the fabricated article. And, even more important, the way had been opened for quantity production.

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and self-quenched. The teeth were hardened to a depth of 0.020-inch to a hardness of 63 rockwell C. Core hardness was 20 rockwell C.

An aircraft wing hinge bolt approximately 10 inches long by 1.5 inches outside diameter was heated with 40 kilowatts of power at a frequency of 3,000,000 cycles per second, and was self-quenched. The part was scanned, that is, drawn through the heating coil at a rate of 5 feet per minute. Case hardness of 50 rockwell C was developed to a depth of 0.025-inch.

Another striking instance of extremely thin surface hardening is that of an aircraft tail wheel axle bolt which was self-hardened with 25 kilowatts of energy at 3,500,000 cycles per second and was in part self-quenched. In this particular case, the inside diameter was maintained at 75 degrees Fahr. with a water flow, while the surface was scanned with the heating coil at 2.5 feet per minute. The use of higher power at the same frequency would have produced the same case depth without the use of internal flow.

Part Is Self-Quenched

An ordinary spur gear approximately 2.5 inches outside diameter by 0.25-inch thick using SAE-1045 steel was hardened with only 15 kilowatts of energy applied with a single turn coil in 1.25 seconds. The part was self-quenched at room temperature. Examination showed that even with the small tooth, the hardened portion was safely restricted to the tooth itself and did not penetrate appreciably into the root.

All the coils used were water cooled and every attempt was made to minimize the load circuit inductance up to the point of actual connection to the heating coil. The heating coil itself approximates a complete circle as nearly as possible for this purpose, and a very narrow neck at the terminal point of the coil is provided. Under these conditions there is no break in the surface heat experienced by the part. That is, it is not possible to detect in the heat-treated part where the coil neck was located.

Tests performed to determine the relation between case depth and time of heat treatment show this relation to be roughly linear to about one second for the power used. As the time was increased appreciably beyond one second, the slope of the case depth curve increased so rapidly that it became evident that accurate control of case depth proves very difficult after more than one second of exposure.

Measurements of temperature at the surface and at fixed depths below the surface to determine the rate of temperature elevations for particular periods of heating time show that the internal temperatures rise very rapidly and that if tempering of the core material is to be prevented, the time during which the core material is exposed to high temperatures must be limited.

In one instance, after a heat treatment of one second the temperature at

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Euclid at East Sixth THE NATIONAL CITY BANK 1845 CLEVELAND'S OLDEST BANK *and Terminal Tower*

1845—ONE HUNDREDTH YEAR—1945

the surface rose to approximately 1900 degrees Fahr. At a depth of 0.020-inch in the same piece of metal, the temperature had risen to approximately 1600 degrees Fahr.; at 0.060-inch depth, it reached 1200 degrees Fahr.; and at 0.125-inch depth, the inner surface, the temperature had risen to 800 degrees Fahr.

Measurements for variation of hardness made from the outermost points in toward the unaffected core material were made with both the superficial rockwell and with the Bierbaum microhardness tester. For neither test did the hardness curve drop below the value of 75 rockwell 15 N which was the hardness of the unaffected core material. Subsequent tests of the same samples with the new Tukon hardness tester agreed perfectly with the findings of the original tests. So far as the author has been able to determine, this is the first instance on record wherein a case has been produced by external heat only without softening, weakening, or tempering the adjacent core layer.

Treatment Takes One Second

Tests to determine the relation between tempering and time produced the following results. It was found that tempering or loss of hardness will take place at a very high rate during the first ten seconds. At a fixed temperature—for the core material near the inner boundary of the surface hardened layer—of 1200 degrees Fahr., the slope of the tempering curve was sharply upward during the first 10 seconds. The same was true at various representative temperatures. Therefore, to avoid loss of core quality, the treatment should be completed in one second or less.

Tests on quench hardened steel show that a steel quench-hardened to 60 rockwell C may have to be drawn back to 35 rockwell C before satisfactory toughness is restored. The obvious dilemma of not being able to have hardness and toughness in the same metal is resolved by thin case hardening.

Tests were made with iron to determine loss from heated metal both by surface radiation to 75 degrees Fahr. air and by conduction through a 0.25-inch metal wall to 75 degrees Fahr. water. It was found that in order to raise an iron surface to 1600 degrees Fahr. and at the same time keep an internal layer 0.25-inch away at room temperature of 75 degrees Fahr., a conduction loss of 5 kilowatts per square inch can be anticipated. This supports in an academic way the practical figures of 10 to 15 kilowatts per square inch required for induction surface heating noted above.

High frequency heating is being used today in many varied manufacturing fields. Numerous remarkable uses such as sterilization and dehydration of foods, the setting of cements, textile drying, heating of plastics, soldering, brazing, in addition to surface hardening—uses valuable to practically every type of industry—have already been developed and employed. What new products hig

Here is a vertical precision mill of exceptional accuracy. It handles rounds from 3/8" to 1½" diameter and can be set up to edge shapes and flats. The extremely simple and rigid design of this mill and its easily accessible adjustments and locking devices have helped make it an outstanding success.

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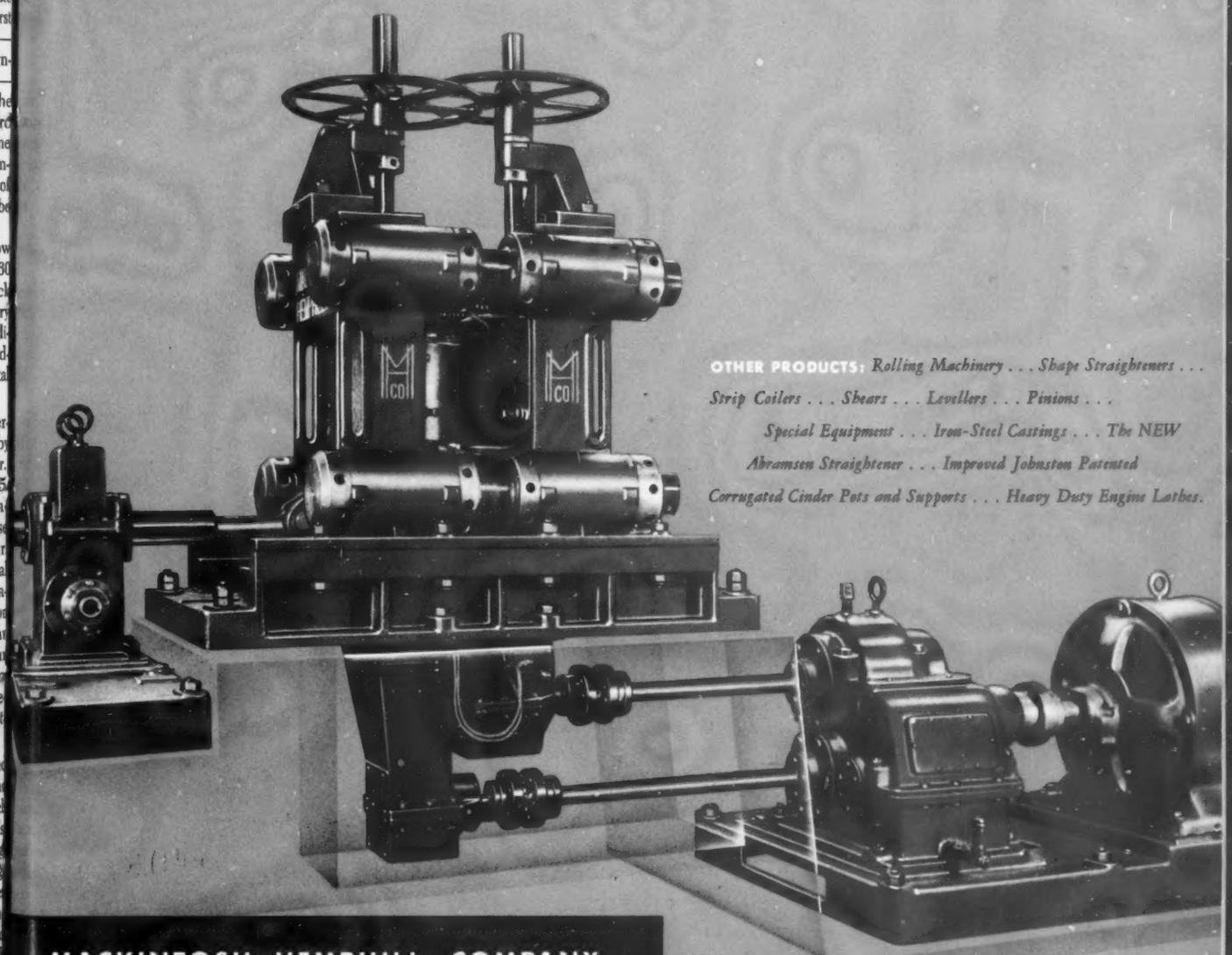
Rolls hot rounds within cold round tolerances



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Is there a place for Moraine Porous Metal in your product? That's hard to say . . . considering that present applications of this unique material cover such dissimilar items as refrigerators and pneumatic tools.

In refrigerators, MPM elements filter out harmful substances to protect the control valves, expansion valve and compressor—separate oil from the refrigerant—serve as retainers at each end of the dryer or dehydrator—and filter out particles in the oil lines to safeguard bearings. In pneumatic tools, an MPM element is provided ahead of the valve to protect the fine orifice from damage by dirt or other harmful substances, while another separates moisture out of compressed-air lines.

Perhaps it is more informative to point out that Moraine Porous Metal has application wherever the flow of fluids, gases or air requires filtration, separation, diffusion or metering. To these functions, Moraine Porous Metal brings the advantages of accurately controlled porosity, tortuous flow passages, good strength and ductility, and adaptability to fabrication in the most efficient shapes. Investigate today.

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MORAINE PRODUCTS Division of GENERAL MOTORS
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frequency heating offers to existing industries and what new industries this versatile heating device promises for the future remains to be seen. That the potentialities are great is amply evident.

Advance in Plastic Molding Seen in Britain After the War

Considerable advances in the field of plastic molding will be made by British industry in the postwar period, according to A. E. Davey, vice president of the London firm of Injection Moulders Ltd., largest custom molders of thermo-plastics in Great Britain. Mr. Davey, in Cleveland on a visit to the factory of the Lester Engineering Co., arranged for the shipment of additional Lester injection molding machines.

"The war has taught us many things about the efficiency of plastic molding," said Mr. Davey, "and much of this new knowledge will be applicable to the manufacture of civilian goods." At the present time, Injection Moulders Ltd. operates the largest injection molding machine in Great Britain, a 16-ounce press made by the Lester Engineering Co.

Mr. Davey's plants have been bombed during the German attacks upon London but have operated continuously on a 24-hour schedule throughout the war. All of the company's injection molding machines are successfully operated by women, most of whom are middle aged or older.

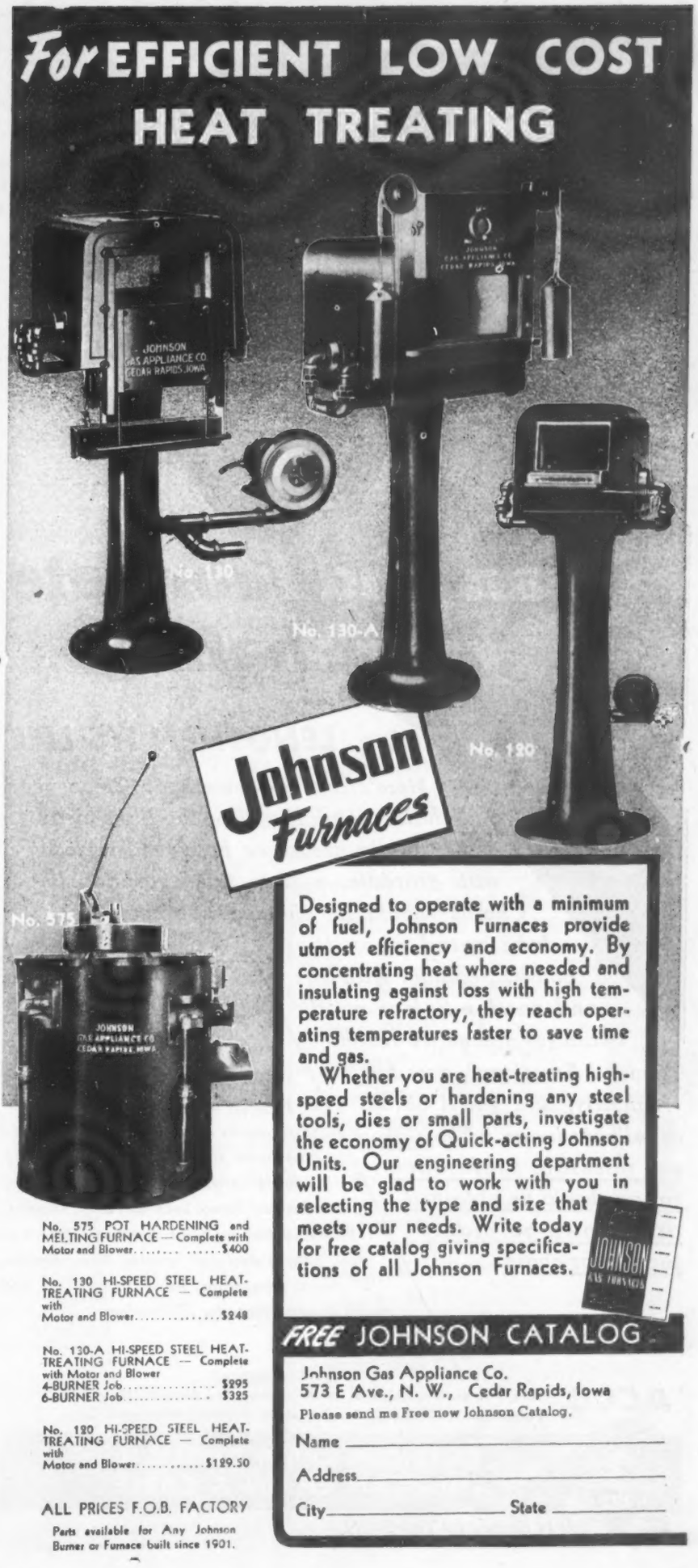
Designing for Die Casting Is Subject of Textbook

A revised book of 64 pages, which has just been published by New Jersey Zinc Co., 160 Front, New York 7, is devoted to basic considerations which must be given by designers and engineers in parts which are to be produced by die casting.

The scope of this 6 by 9-inch book will be indicated by the following, which have been selected more or less at random from its 34 chapter headings: Types of dies; principles of designing; undercuts; ribs; bosses; threads; cores; draft allowance; tolerances; inserts; and selection of alloy. Each chapter is clearly illustrated by one or more line drawings in perspective.

Necessity for careful study of a book of this nature before attempting to design for die casting is driven home in the foreword in this way: "Limitations imposed by the die casting process should be considered in the design before it has advanced so far that changes may prove to be impossible or impractical. Such early consideration is the surest way to realize the full advantages of economies inherent in the process of die casting."

Copies of this book are available to designers, engineers and others responsible for die casting specification who so identify themselves by formal requests on company letterheads.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Automatic Dipping Setup

(*Concluded from Page* 118)

meet mass production demands. It has resulted in a 100 per cent coating of the B-24's rivets and small parts which meets anodic specifications for corrosion resistance.

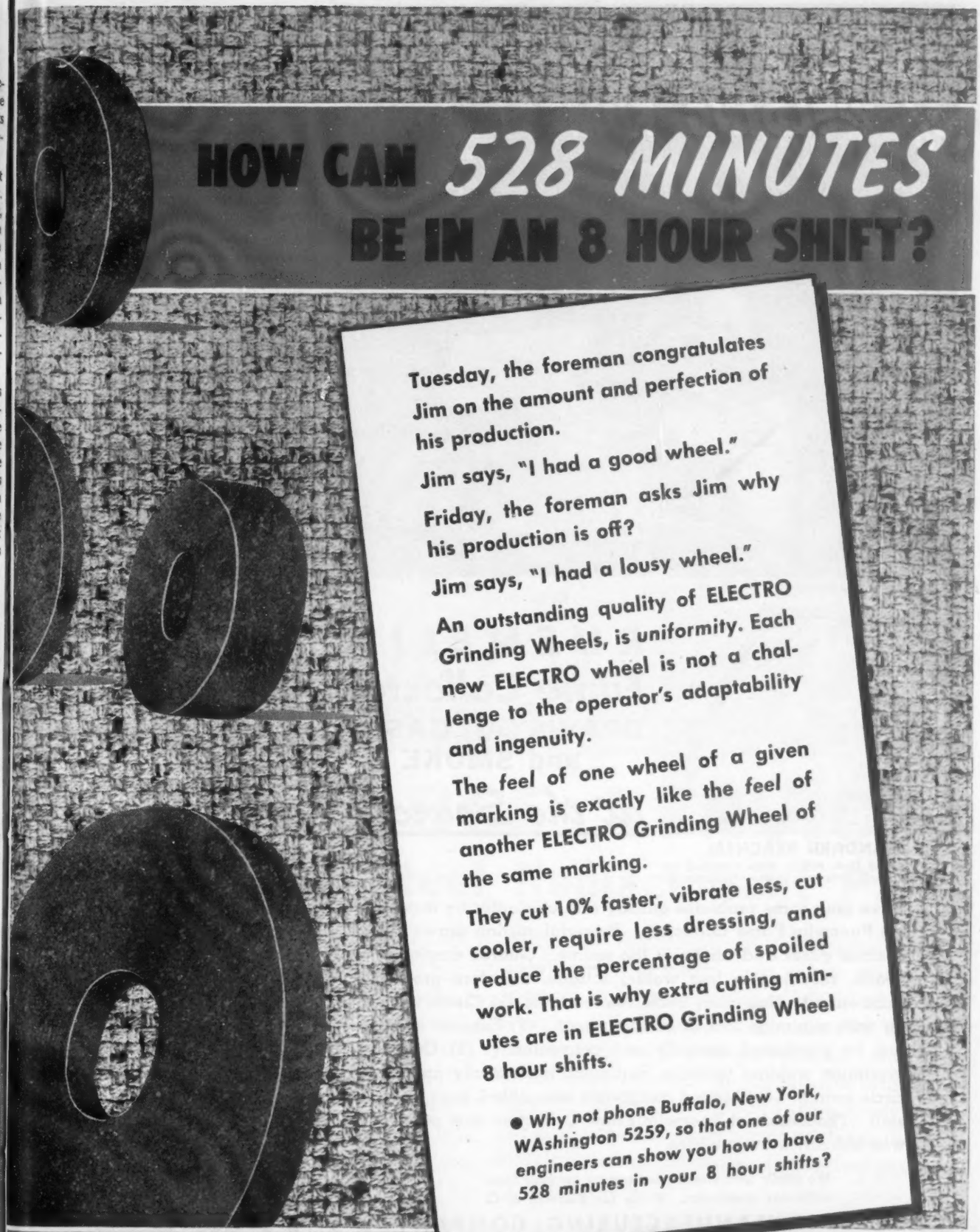
The original process called for different kind of solution for each type of alloy. Ford development engineers, however, adapted a standardized and uniform process which requires only one solution for all types of alloys. Alrok has been found to produce very satisfactory coatings which compare favorably with finishes resulting from chromic acid electrolytes, as far as paint adhesion and corrosion resistance are concerned. The coating is adherent and will not rub off.

Advantage of the alroking process lies in the fact that the barrel plating technique can be used. It is highly adaptable to volume production and no re-runs are necessary. Production capacity of the automatic alroking machine is 700 pounds per hour, using 40-pound baskets; with 60 pounds in the baskets, capacity of the machine is 1050 pounds per hour. Alrok treatment is given to all base alloy parts such as rivets, extrusions and castings.

Trucks Have Interchangeable Forks

Power industrial trucks equipped with interchangeable swivel forks feature greater flexibility in operation, according to Elwell-Parker Electric Co., Cleveland. Model F-15 is built for paper mill or printing plant use and is equipped with a roll handling scoop. This truck can pick up, carry, store, or stack the heaviest newsprint rolls, and load or unload them in railroad cars. The rolls can be carried or stacked in either vertical or horizontal positions with no damage to the paper. It takes only a few minutes to remove the roll handler and attach the fork, when the truck can be used for handling and hauling flat stock on skids, or pallets, or for handling bales of raw materials in the mill or storage warehouse.

The long sharp forks can also be used for handling rolls if desired, although the scoop attachment is generally preferable. An advantage is that the scoop can be swiveled almost instantly from horizontal to vertical position for easy passage through doors or narrow aisles, and just as quickly returned to horizontal position at destination. Equally important is the protection of paper in handling and in transit. By having both appliances available, it is possible to get a wide range of service from a single truck. Numerous appliances for handling, transporting and dumping other kinds of materials have been developed for swivel mounting, interchangeably with suitable forks to handle the general run of work such as pallet and skid loads, crates, boxes and barrels.



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Tuesday, the foreman congratulates Jim on the amount and perfection of his production.

Jim says, "I had a good wheel."

Friday, the foreman asks Jim why his production is off?

Jim says, "I had a lousy wheel."

An outstanding quality of ELECTRO Grinding Wheels, is uniformity. Each new ELECTRO wheel is not a challenge to the operator's adaptability and ingenuity.

The feel of one wheel of a given marking is exactly like the feel of another ELECTRO Grinding Wheel of the same marking.

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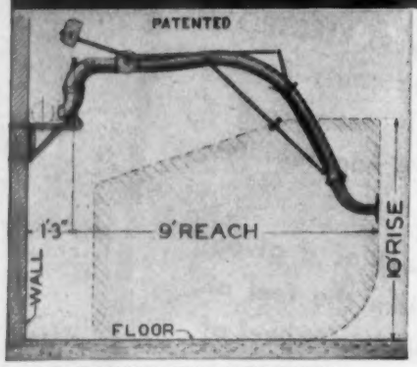

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Truck-Tow Conveyors

(*Continued from Page* 124)

mechanical handling problem on hand, and in due course awarded Link-Belt Co. a contract for the design, manufacture and installation of the aforesaid three overhead trolley conveyor truck haul systems—a type of conveyor equipment which Link-Belt had pioneered in plants of this type and which readily met all requisites.

As shown in the photographs these conveyors are used for towing wooden platform, nest-body floor trucks accommodating the projectiles vertically in racks.

Each truck is equipped with four wide-tread, anti-friction wheels and has a rigid pipe mast for engagement with conveyor chain pushers. The front wheels are smaller than the rear wheels, and are of swiveling construction.

Conveyor Described: In plan view, each conveyor consists of a rectangular loop of I-beam track, approximately 2000-foot centers by 3 feet wide, supporting at 40-inch intervals the ball-bearing trolleys from which is suspended a power-operated endless drop-forged rivetless conveyor chain.

Two-point booster drives, located midway on the rectangle, propel the "coming" and "going" chain at a speed of 75 feet per minute into counterweighted automatic take-ups located at the two ends of rectangle. These take-ups automatically preserve the proper tension of conveyor chain.

Conveyor chain is equipped with pusher shoes immediately behind trolleys, at 50-foot intervals, designed to accommodate and automatically engage the rigid pipe masts which form part of every truck.

The engagement of pushers with mast is smooth and it is but necessary for attendant to roll the truck in line with conveyor chain to permit next oncoming pusher to pick it up.

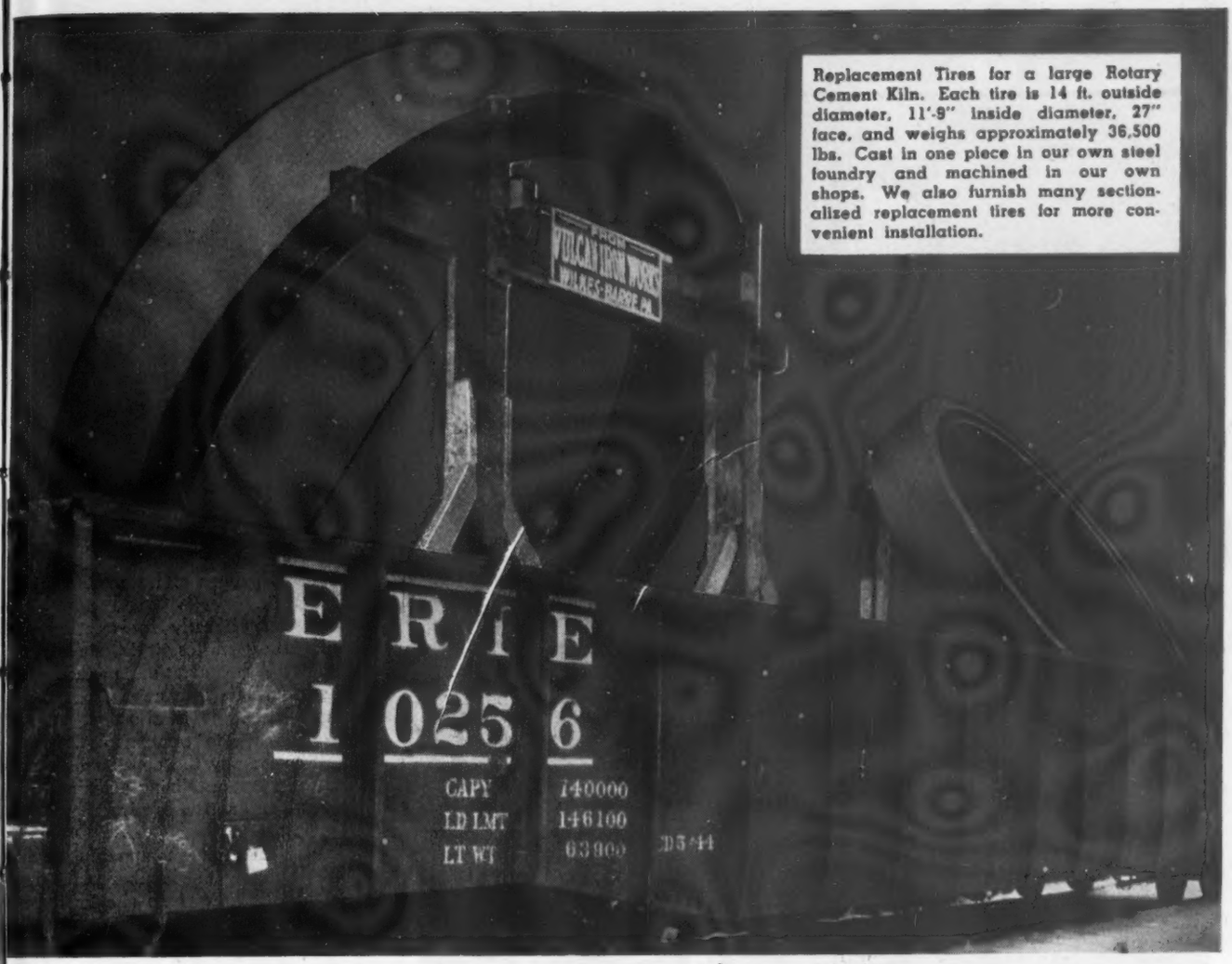
Slight inequalities in ramp and building floors are compensated for by the fixed mast floating up and down in the pusher shoe, which is made wide enough for this purpose.

At points where it is desirable to unload trucks at each building entrance the conveyor track and chain rise in a vertical curve to allow pusher to disengage the mast. An attendant then pushes the truck to the proper building bay.

Interesting Features: A series of explosive-proof start-stop push button stations located in the ramps and buildings provide adequate protection in case it is required that the conveyor be stopped for some reason.

Fusible-link fire doors hung in brick fire stops, located midway in the ramps, are notched to close snugly around the conveyor chain and track, and are wired into the system so that the conveyor will come to a stop in the event of their closing.

The trucks run straight without appreciable "yaw." This is evidenced by



Replacement Tires for a large Rotary Cement Kiln. Each tire is 14 ft. outside diameter, 11'-9" inside diameter, 27" face, and weighs approximately 36,500 lbs. Cast in one piece in our own steel foundry and machined in our own shops. We also furnish many sectionalized replacement tires for more convenient installation.

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Repeat orders are the best evidence of satisfactory service and Vulcan has been furnishing large cast-steel replacement parts to many well-known organizations for nearly a quarter of a century. The two tires shown above are not only a repeat order, but also illustrate another important point—that our replacement-part service is not confined to equipment of our own original manufacture.

Write us regarding any requirement involving either carbon or alloy steel castings up to approximately 40,000 lbs. in unit weight. We provide any desired degree of engineering, pattern-making and machine-shop service; including the manufacture of complete special machinery according to the purchaser's designs and specifications. Estimates furnished promptly on request.

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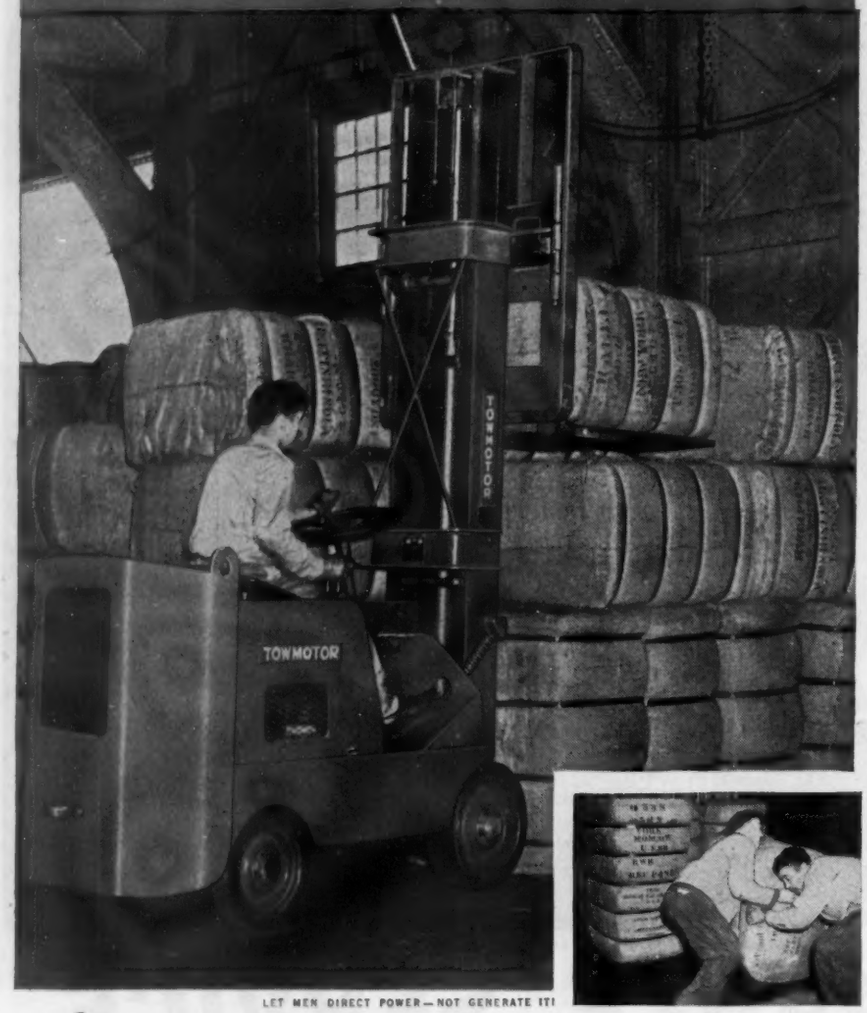

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THE ONE-MAN-GANG

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wheel marks on ramp floors where continuous travel has effaced the paint from the otherwise mirror like concrete floors. Neatness and good housekeeping in this type of plant are synonymous with safety.

Maintenance has been negligible on the conveyors, outside of periodic greasing of trolleys and truck wheels; and Remington-Rand have reported eminent satisfaction with the system as a whole.

One need but see the conveyors in operation to appreciate the man-size job they are performing.

Cyanide Unit Processes Plating Wastes

Cyanide is one of several chemicals used in cleaning and plating operations at the Ford Willow Run bomber plant. To prevent pollution of the Huron River below Willow Run, a cyanide disposal unit daily processes an average of more than 300,000 gallons of water containing plating wastes.

Designed specifically for treating industrial plating wastes, it is one of the first to use the aeration method for treating cyanide waste on a large scale industrial basis. It is also first to use ferrous sulphate to treat chromic acid, and first to employ the continuous process method for neutralizing acids and removing toxic materials from plating wastes.

Need for this unit was apparent at the outset of building the bomber plant, but at the time there was no similar industrial unit in operation to serve as a guide. Research was started in November, 1941, and the plant went into operation in October, 1942.

Great care is exercised in handling cyanide, a deadly poison in any form. A dual system was set up—one to treat cyanide and the second for acids—to prevent uncontrolled combining of cyanide with any other acid to form and give off deadly gas.

Two drains made of noncorrosive iron with a siliceous lining, resembling porcelain, carry the plating wastes from the Willow Run plant to the disposal unit about half a mile away. One line is reserved for cyanide while the second carries the acids.

For treatment, cyanide waste is directed into one of three sealed, 27,000-gallon tanks, where the cyanide content is determined. Sufficient sulphuric acid is added to change the cyanide into hydrogen cyanide gas. Air is forced in at the bottom of each tank by two blowers, each with a capacity of 250 cubic feet a minute. This air bubbles up through the liquid and helps mix the acid with the waste. Then it passes out through a stack connected to each of the three tanks, carrying with it the gas formed.

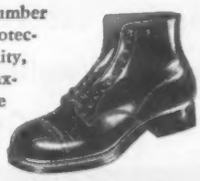
To dilute further the concentration of hydrogen cyanide gas as it leaves the stacks, a large fan blows in air at the rate of 5000 cubic feet a minute. Thus the dilution of hydrogen cyanide gas is so great that one could breathe the air coming from one of these stacks for

The man who likes to have management look over his shoulder

The Safety Director knows his work will be more successful if top management is interested enough to see how his department is saving lives and guarding man hours. Even when the record is not as good as he would like, the safety director knows that correction is easier when management is ready to establish his remedy as plant policy. Where management works closely with safety departments, outstanding safety records are being achieved. That this practice is on the increase is gratifying to all who are concerned with providing greater safety to America's working men and women.

HY-TEST Safety Shoes

. . . are available in a number of types for various protective needs. Extra quality, comfort features and maximum protection are the reasons Hy-Test has long been a favorite of safety shoe wearers.



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MANUFACTURERS OF COLD FINISHED CARBON AND ALLOY STEEL BARS

several minutes without toxic effect. There is no danger to nearby vegetation.

After removal of the cyanide the waste water with its sulphuric acid content is pumped into a mixer, where lime is added to neutralize the acid. The water, after passing through settling tanks, is emptied into the small stream that flows past the plant.

Chromic acid, the major portion of the waste acids, is treated by a continuous process. Ferrous sulphate is first added, producing a chemical change so that later addition of lime water will cause both the chromium and the ferrous sulphate to settle. The other acids are neutralized in the continuous process by adding lime water.

Employment of ferrous sulphate to reduce chromic acid, it is interesting to note, utilizes one waste to treat another. An iron salt, it is recovered from pickling solutions used in treating steel.

Flexibility of the plant is illustrated by the fact that two different treatments of chemical wastes can be carried on simultaneously by using one or both sets of flash mixers and flocculators as needed. The settling tanks also are connected in sets of two, permitting operation of the number desired.

To treat the more than 8,000,000 gallons of industrial waste that pass through the disposal system each month requires an average of 3 tons of lime, 2½ tons of ferrous sulphate, and 100 gallons of sulphuric acid.

Electronic System Concentrates Penicillin

A new electronic system for bulk reduction of purified penicillin solution has been developed by Radio Corp. of America and put into use at the E. R. Squibb penicillin plant at New Brunswick, N. J. After penicillin is produced by biological methods, it becomes necessary to reduce the bulk or concentrate the solution evaporation methods. The new system uses high frequency current to evaporate the solution, accomplishing in 30 minutes what formerly took 24 hours.

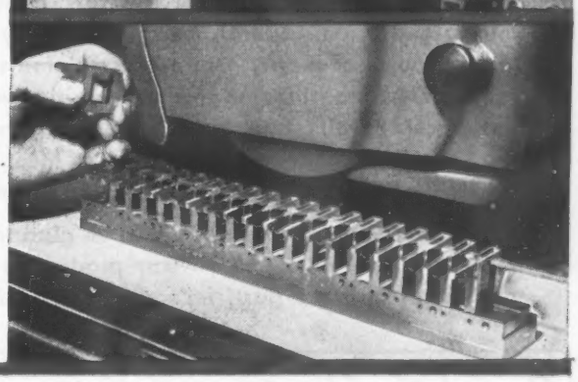
Three glass bulbs are connected in a vertical series and attached to a pump which maintains a relatively low vacuum. A glass tube at bottom of lower bulb extends into a container of penicillin broth. At base of lower bulb are two electrodes connected by a tuning coil. Electrodes are connected to an electronic power generator. When vacuum is created, penicillin solution rises into base of lower bulb where the radio-frequency current heats it to 50 degrees Fahr., causing solution to boil and evaporate into upper bulbs. This equipment can concentrate in 24 hours enough penicillin to treat 4000 patients requiring 500,000 Oxford units each.

The generator employs six resistors and two rheostats: A 200 watt regulator plate resistor, two 200 watt cathode bias resistors for two power tubes, a

58 OPERATIONS

AND ONLY 1 GRINDER

DoALL PRECISION GRINDER



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58 distinct grinding operations are required in the finishing of the 24" calipers alone; the DoALL Surface Grinder does them ALL with speed and utmost precision, demonstrating again its remarkable versatility for all types of grinding.

The lower illustration shows two dozen caliper jaws being ground at the same time.

Write for literature which gives full specifications of the DoALL Grinder.

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Each DoALL carries a Test Bar and Performance Tag giving the micro-inch finish the grinder produces.

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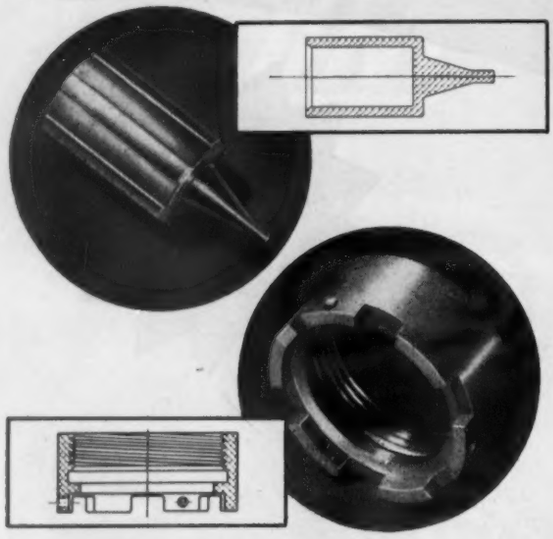
for SCREW MACHINE PRODUCTS . . .



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For screw machine products and cold-forged parts, Federal Screw Works may well be your most logical source of supply. Our extensive plants are fully equipped for all screw machine and second-operation work, and for widely varied cold-forging and thread-rolling jobs as well. And we have the specialized skill and experience to meet your most exacting needs . . . in any volume . . . and right on schedule.

Our manufacturing specialists will be glad to work with you on both your present and post-war production problems. Without obligation on your part, let's sit down and talk it over—*now!*

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SIX TIME WINNERS OF THE ARMY-NAVY "E"

In January of this year, 48 concerns throughout the country were the first to receive a fifth star for their Army-Navy "E" flags. Federal Screw was among those to be honored. Since the award of the Navy "E" burgee early in 1942, this company has maintained its record of high production achievement since the earliest days of the war.

ARMY E NAVY

CHELSEA DIVISION

Federal SCREW WORKS

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50 watt rheostaat used as a cathode balancer, two 10 watt resistors for voltage dropping in the pilot light circuits, a 10 watt resistor in a time delay relay circuit, and a 50 watt rheostat for output power control, all manufactured by Ohmite Mfg. Co., 4835-41 Flournoy, Chicago 44.

High Strength Alloy is Nonferrous, Nonmagnetic

A nonferrous, nonmagnetic alloy of high strength, high wear resistance, high electrical resistivity and good corrosion resistance, Wyndaloy-Chace 720, is manufactured by Wyndale Mfg. Corp., 1203 Cornell, Indianapolis. Special heat treatments are said to produce forgings with a 400-500 brinell hardness, tensile strength value exceeding 200,000 per square inch, and yield point values exceeding 150,000 per square inch. Elastic properties and ductility are claimed to be superior.

Alloy has a silvery color, will take a high polish, has a modulus of elasticity of approximately 20 x 106 per square inch, and its coefficient of expansion is about the same as copper. It can be supplied in form of drop forgings or open frame hammer forgings, and will be available in as-forged condition, as-forged and heat treated, or as-forged, machined and heat treated.

Equipment Protected by Moisture Absorbent Agent

A moisture-resistant method of packaging, effective even in humid tropical areas, has been developed by the U. S. Army Signal Corps. It utilizes a drying agent called silica gel, which has appearance of crushed or granulated quartz. It is so porous that a cubic inch has more than 50,000 square feet of absorbing surface, making it possible for it to take up and hold approximately half of its own weight in water without swelling, caking, or becoming appreciably wet to the touch.

One or more bags of the drying agent are enclosed with each package of equipment sent overseas, placed within a moistureproof sealed wrapping made of plastic or a laminated wrapping composed of paper, metal foil and plastic. Bags range in size from 5 grams to 5 pounds each and usually are made of cotton cloth, although some are of tough paper construction.

A feature of this method is the indicator card which can be inserted into any package to "report" the condition of equipment protected with silica gel. Indicator consists of a small quantity of the gel, treated with cobalt chloride and contained in a manila envelope with an acetate window. It takes on a deep blue color when fully activated, but absorption of moisture changes the color to violet and then to pink. When maximum amount of water has been absorbed, indicator shows flesh color.

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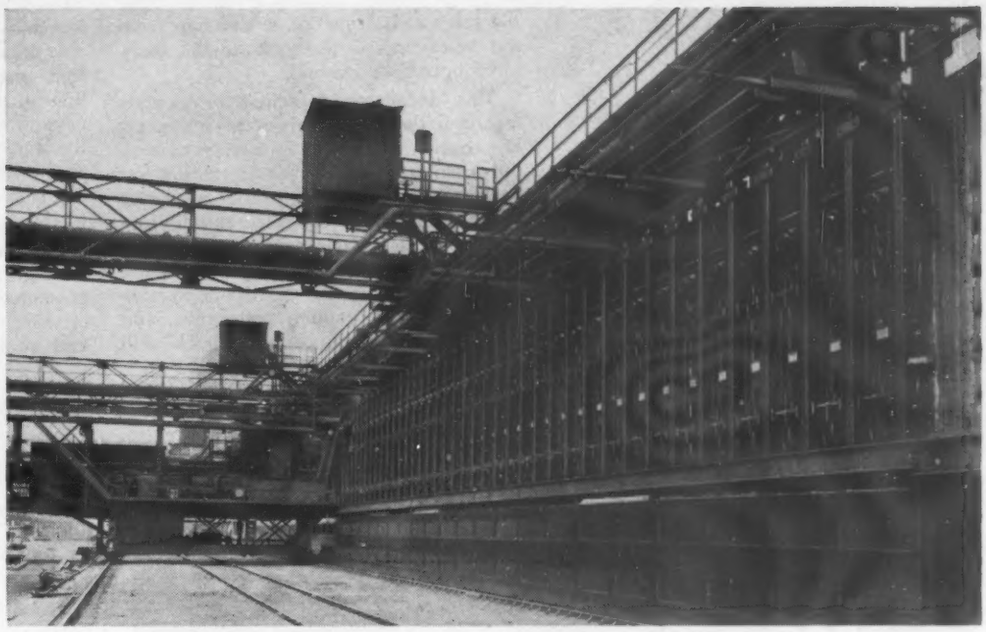
And Keep Them!



REBUILD AND MODERNIZE OLD COKE PLANTS

Coke ovens of modern design can be built to utilize a large part of the existing oven steelwork and old foundation pad, and, with minor modifications, the existing machinery. If desired, the new ovens can increase the coke-producing capacity. Ovens not now equipped for blast-furnace gas underfiring can be rebuilt as combination ovens. All this can be done at great speed and with little interruption to operations.

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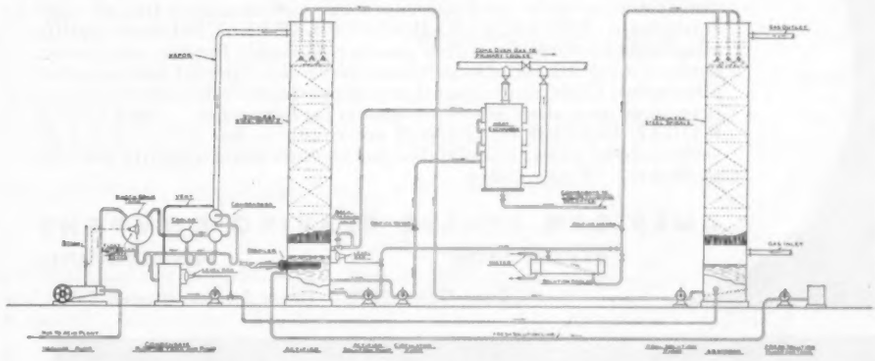
MAKE YOUR OWN ACID FROM COKE OVEN GAS

The hydrogen sulfide in coke-oven gas can be recovered at low cost by the Koppers Hot Actification Sulfur Recovery Process for making sulfuric acid for ammonium sulfate manufacture and for light oil washing. Where H_2S concentrations are high, sufficient acid may be recovered also for the pickling plant. We will be glad to tell you about this process and how it operates.



REROOF YOUR BUILDINGS

In recent hurried years, the maintenance work on many industrial buildings has been neglected. Roofs particularly have suffered. Have someone look at your roofs now. If your buildings need re-roofing or roof repairs, specify Koppers Coal Tar Roofing Materials, and you can go through these busy periods of maintenance - neglect without danger. Coal tar pitch is long-lasting and needs little maintenance.

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Book Notes

Handbook on American Malleable Iron Practice

American Malleable Iron, fabrikoid, 367 pages, 6 x 9 inches; published by Malleable Founders' Society, Cleveland, for $4.

This is a handbook designed to present in concise form information previously existing only in the scientific and trade press, in order to make it available to students, teachers, engineers, metallurgists and all who may be interested in the subject. Its function is different from the metallurgical textbook or the technical operating manual.

This form of presentation permits technical data to be given in sufficiently narrative form to be of interest to both the scientific and lay reader. Effort has been made to reconcile the divergent theories and practices which exist in any metallurgical art. In present accelerated economy manufacturing practices do not long remain static and what is impossible today may be routine tomorrow, and future revisions of the handbook will strive to keep up with changes.

After a chapter on background the handbook takes up the physical, mechanical and engineering properties of malleable iron, the various types, pattern design, machining practice, recommendations to users and the manufacture and metallurgy of the product. A history of the malleable iron industry and a list of applications of the material also are included.

Appendixes include ASTM specifications, protective coatings, a selected bibliography and conditions of sale. Also presented are a glossary, bibliography of sources, engineering tables and data and an index.

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Personnel Relations from Variety of Viewpoints

Personnel Relations, by J. E. Walters; cloth, 547 pages, 6 x 9 inches; published by the Ronald Press Co., New York, for $4.50.

Principles and practice in the field of personnel relations as they are today furnish the material of this volume. It includes in its scope the varying phases as determined and influenced by workers in labor unions, managements, the government, labor-management co-operation and individual employes.

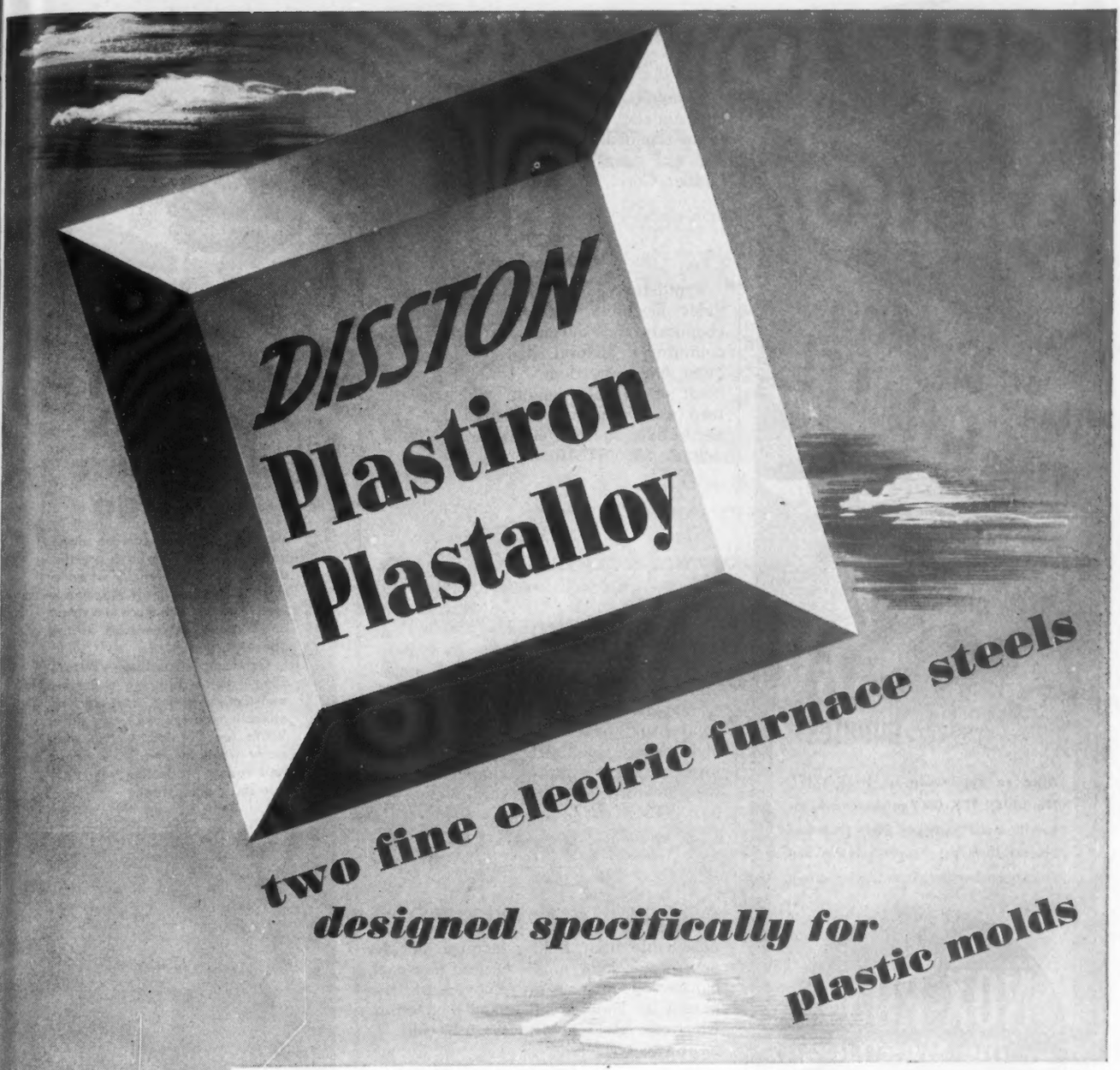
The attempt is to present personnel relations not in a mere descriptive sense but from positive democratic viewpoints of those actively concerned. Thus the author admits that management may not agree with Part I, which is from labor's viewpoint and labor may not agree with Part II which has the viewpoint of progressive management. The same applies to other sections but the writer believes that when all are recognized, heard and considered and the facts found and used democratically sound progress will be made. The effort has been to select and portray the better principles and practices of responsible unions and successful managements, rather than to emphasize their faults.

The discussion covers techniques of employment, training, safety and service activities and industrial relations, including collective bargaining. A list of selected general references on personnel relations is appended as a source of further reading and an index aids search for particular references.

Engineering, Machine Shop Terms Defined

Dictionary of Engineering and Machine Shop Terms, by A. H. Sandy; cloth, 153 pages, 2½ x 8½ inches; published by Chemical Publishing Co. Inc., New York, for $2.75.

This is the first American edition of a British publication revised by I. E. Berck to fit it for users in this country. Its purpose is to provide a lexicon showing exact meanings of common words and terms as applied to industry. Its use in connection with many textbooks where meanings are taken for granted will give better understanding of the text.



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Synthetic Gloves — Compound provides flexibility and resistance to all chemicals and solvents. Curved finger conforms to natural shape of hand and gives finger freedom. Made in assortment of weights, lengths and sizes for men and women. Industrial Products Co., 2820 North Fourth street, Philadelphia 33. ST316

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Connector — Self-locking quick-disconnect electrical connector designed for small wires. Composed of two identical halves, it slides together in jack-knife fashion and locks in a positive position with a slight pull. Connection is opened by pushing halves together and giving a slight swing. Made of copper and heavily silver-plated, it has high electrical efficiency and resistance to corrosion. Burndy Engineering Co. Inc., 107 Bruckner boulevard, New York 54. ST312

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Electrode Holder — Designed with detachable front, holder features include nonfreezing joint, ample current and cool handle. Front may be removed and replaced by hand in 30 seconds. Detroit Electrode Holder Mfg. Co., Detroit 8. ST321

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Dust Hood — Offering full vision and practicability against fine dusts, light weight hood is constructed of cotton sheeting over cloth cap with fiber window opening 5 x 6 inches. Cellulose acetate plastic window may be replaced. Tape tie inside bottom hem for pulling close to neck. Industrial Products Co., 2833 North Fourth street, Philadelphia 33. ST323

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Control — Electronic method provides control for concentration changes with corresponding electrical conductivity change where necessary to maintain interface between two liquids differing in electrical conductivity. Sensitivity range of 100 to 5000 ohms and operates on 5 per cent change in probe-circuit resistance. Probe voltage does not exceed

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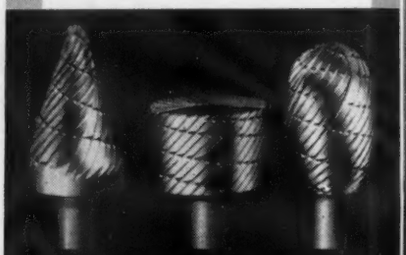

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25 volts. Incorporates single-pole, double-throw relay, rated at 10 amperes alternating current, 5 amperes direct current. Photoswitch Inc., Cambridge, Mass. ST319.

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Cleaner — Adapted for quick removal of drawing compounds or cutting oils in a single operation. May be used in dip cleaning and spray washing. Special Chemicals Division, Pennsylvania Salt Mfg. Co., 100 Widener building, Philadelphia 7. ST313

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Fluorescent Lamps—Four sizes of thin fluorescent lamps of instant starting type, not requiring starters. Feature operation at more than 1 wattage and current value. Each with single pin base of hot cathode design and furnished in white color only. General Electric Co., Nela Park, Cleveland. ST318

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Process Equipment — Designed for melting, blending and compounding plastics and chemical formulations. System features quick uniform heat with close temperature control; no pumps to circulate vapor; hermetically sealed vapor; constant level in dipping compartment maintained by air driven impeller pump; operation at low vapor pressure. Castaloy Metal Sales Co., 197 South Waterman avenue, Detroit 17. ST308

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Aprons — Made with cotton fabric and a vinyl resin coating which makes the aprons waterproof, acid proof, alkali proof, oil and grease resistant. They are flexible, constructed with hemmed edges, reinforced neck and waist tapes. B. F. Goodrich Co., Akron, O. ST297

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Polishing Wheels—Designed to remove a relatively small amount of material such as a burr or sharp edge or to polish a surface that is already to size are cork resinoid, fiber resinoid and resilient rubber wheels. These types of wheels differ from each other with respect to the kind of flexible bond that supports the abrasive grain. Norton Co., Worcester, Mass. ST334

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Blueprint Cabinet — Designed for flat storage of drawings, tracings, blueprints, charts, photographs, etc., cabinet has a rigid frame for continuous alignment of drawers. Drawers and compartments equipped with hinged paperweights in front and protecting hoods in rear, handles and labelholders. Standardized and

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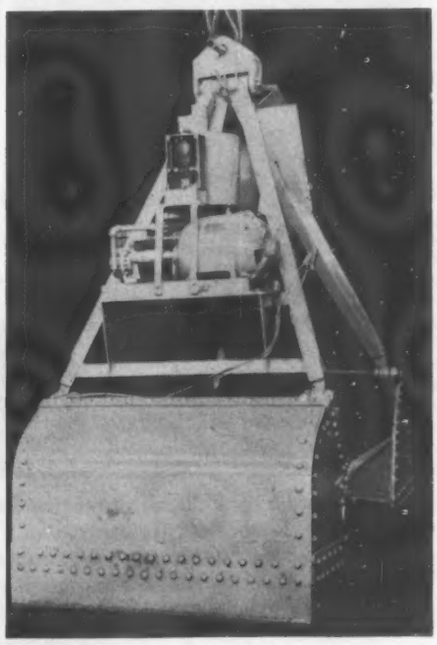

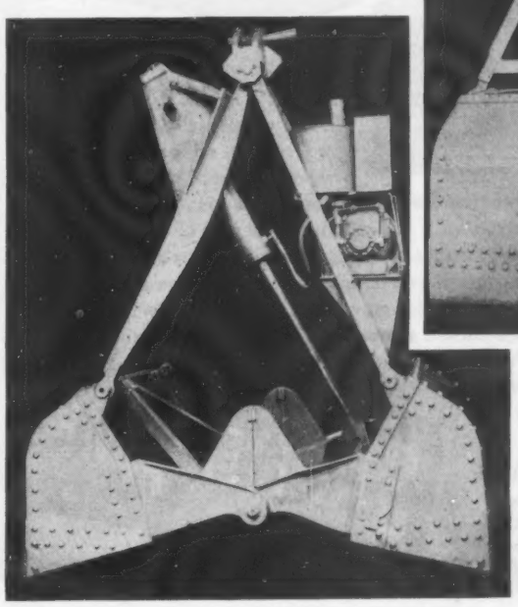

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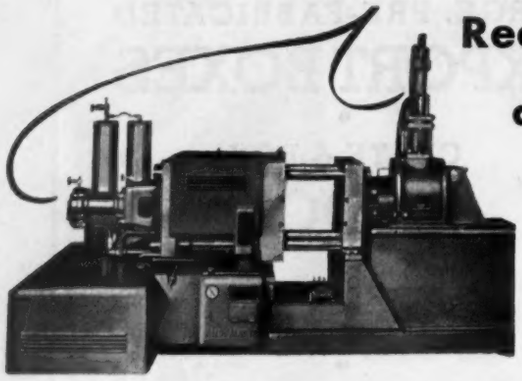
Hannifin Cylinders power the Reed-Prentice die casting machines



The Reed-Prentice hydraulic die casting machines use Hannifin precision hydraulic cylinders for both die closing and plunger operation. Die casting service, one of the most severe tests of hydraulic cylinders, requires the best. Hannifin precision hydraulic cylinders meet these requirements. Cylinder bodies are bored and honed, providing for efficient piston fit, maximum power and minimum fluid slip. No-tie-rod design provides a strong, simple cylinder assembly, easily mounted.

For the most from hydraulic power, consult Hannifin engineers.

Write for Bulletin 35 with complete specifications. Hannifin Manufacturing Company, 621-631 South Kolmar Avenue, Chicago 24, Illinois.

Hannifin

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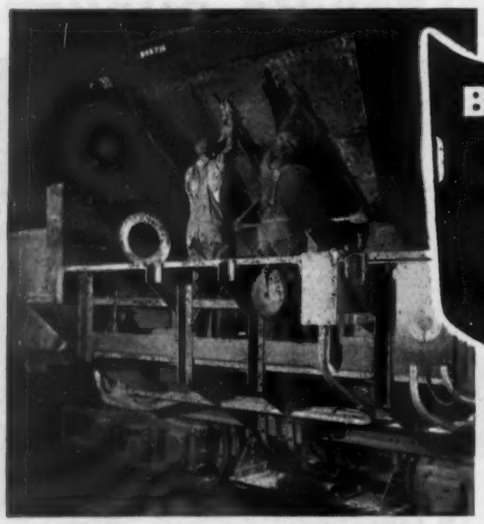

BLAST FURNACE WEIGHTS *Accurately Recorded!*

HERE'S A STREETER-AMET LC-2 accurately and automatically recording the weight of each ingredient in a blast furnace charge. It records the weights on continuous paper in full figures. Ingredients are chalked on a blackboard in center of dial. Predetermined weights are marked by bright colored, adjustable clips on dial rim.

Supersized dial is easy to read at either end of car. Exclusive hydraulic control eliminates unnecessary indicator movement or other effects from car vibration. Printer is usually actuated remotely. Whole unit is rugged, durable, long-lifed. Streeter-Amet Recorders serve all branches of the Steel Industry. Send for an engineering Bulletin

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Head Protector — Made of molded fiber, caps employ soft, flexible band fitting any shaped head, with lining and hammock arranged to cushion blow. Weigh approximately 6 ounces. Portable Products Corp., 420 Boulevard of Allies, Pittsburgh 22. ST322

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Paint — Confined to neutral gray color, paint neither blisters nor cracks under high temperatures. Used for high pressure steam lines, smoke stacks, heat treating equipment, kilns, dying and carbonizing equipment, etc. M. J. Merkin Paint Co., 1441 Broadway, New York. ST310

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Indicating Light—A new light, DeLuxe No. 659 D/E unit for 120 volt service of shallow depth. Overall depth behind the panel front to the end of the insulation barrier is 1 inch. For single-hole mounting in a 1 3/8-inch diameter hole in panels up to 1/4-inch in thickness. H. R. Kirkland Co., Morristown, N. J. ST350

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Cement—For pattern making, a waterproof fillet cement is said to save time and labor in the pattern shop. Sand will not stick to the edges of a fillet on which it has been used. It employs neither water nor alcohol as a solvent. Kindt-Collins Co., 12651 Elmwood avenue, Cleveland. ST339

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Protectors—Designed and constructed for durability in protecting fittings, exposed openings and ends, tubing, etc. from moisture, rust, dirt, grit, dust or damage in packing, storage or shipping. Thread protectors and dust caps are made of spiral-wound fibre, kraft paper, or cellulose acetate under heat-treated compression. Precision Paper Tube Co., 2033 West Charleston street, Chicago 47. ST333

—o—

Rust Inhibitor—For use as a protective treatment for all metals, either in process or as final dip, Riso, a soluble oil, withstands severe conditions under heavy production and performs well in the presence of acid fumes. Applied by dipping at a temperature not exceeding 140 degrees Fahr. Protective Coatings Inc., Box 56, Detroit 27. ST352

HELPFUL LITERATURE

1. Cable Swagers

Standard Machinery Co.—4-page illustrated catalog section CS describes cable swaging machine which employs rotary action. Operation, parts and typical applications for this power machine are shown.

2. Industrial X-Ray

Standard X-Ray Co.—12-page illustrated bulletin "Standard Industrial X-Ray Units" contains descriptions and covers technical details on line of industrial X-ray equipment. Units are available in capacities up to 220 kilovolts.

3. Torque Tools

Richmont, Inc.—12-page illustrated bulletin is on Torq-Stop tool operating features and describes over 60 models and sizes of torque wrenches, bottle cap wrenches, torque screw drivers and other torque tools. Specifications are listed.

4. Sales Management Control

Systems Div., Remington Rand, Inc.—96-page illustrated bulletin "Graph-A-Matic Control for Sales Management" outlines system of control and shows available equipment which can be utilized for this purpose. Details are given regarding visible sales control records, business forms, indexing systems and other business aids.

5. Blast Cleaning Cabinets

Ruemelin Mfg. Co.—8-page illustrated bulletin No. 32-B outlines available types and lists industrial applications of line of blast cleaning cabinets. Wide range of sizes and styles is available to handle practically any blast cleaning needs.

6. Rotary Pumps

Roots-Connersville Blower Corp.—4-page illustrated bulletin No. 61-B11 gives ratings and discusses features of cycloidal rotary pumps for heavy duty service. These units are efficient for moving relatively large volumes of fluids against moderate heads.

7. Hydraulic Presses

Reimuller Bros. Co.—Three 2-page illustrated data sheets give features, specifications and operating information on line of 10 and 20-ton Hy-Speed gap style hydraulic presses which employ foot-operated hydraulic unit to apply pressure.

8. Welding Positioners

Ransome Machinery Co.—40-page illustrated bulletin No. 2147 explains advantages of proper positioning for welding and outlines use of positioning equipment which is available in capacities ranging from small hand-operated unit to heavy duty machine capable of handling 40,000 pounds.

9. Protective Coatings

Quigley Co.—6-page illustrated folder on Triple-A protective coating lists properties of various types of industrial finishes for protecting and decorating iron, steel, wood, brick and concrete, as well as other surfaces. Included are color chips on all types of protective coatings for interior or exterior use.

10. Stainless Clad Steel

Granite City Steel Co.—16-page illustrated bulletin is entitled "Important Facts About Granite City Superbond Stainless-Clad Steel." Typical applications of this material are shown. It is easily formed, drawn, punched, beaded and fabricated. Gages range from 8 to 20-gage with finished plate sizes of 72 by 176 inches.

11. Industrial Furnaces

Surface Combustion—4-page illustrated bulletin No. SC-121 is entitled "Surface Combustion Furnaces in the Production Line." Typical plant layouts for production process annealing and production heat treating are covered. Table lists Rockwell hardness versus drawing temperatures for several S.A.E. steels.

12. Laboratory Facilities

J. O. Ross Engineering Corp.—8-page illustrated bulletin entitled "The Ross Laboratory" is descriptive of facilities offered by this company for testing heat, ventilating, drying, baking, processing and heat treating equipment.

13. Remote Control

M. L. Bayard & Co.—8-page illustrated manual No. A-100 is first in series of manuals covering various phases of engineering and manufacturing. Data are given on remote mechanical control elements which utilize universal shaft, steady shaft and bevel gear assemblies.

14. Circular Welded Products

American Welding & Mfg. Co.—6-page illustrated bulletin entitled "Say American" shows typical circular welded steel products which are fabricated by resistance, arc and gas welding methods. Facilities of company and experience in this work are outlined.

15. Air Operated Collets

Redmer Air Devices Corp.—17-page illustrated catalog is descriptive of air-operated collet holding fixtures for precision chucking on milling, drilling, tapping, threading, burring and other machine tools. These air-actuated devices provide precision means for holding small parts.

16. Office Forms

United Autographic Register Co.—Portfolio contains samples of purchasing forms, manufacturing records, bills of lading, invoices and invoice combinations, voucher, check and tab payroll records. These machine-written forms are designed to facilitate handling of office detail concerned with sale and record keeping on all types of equipment and materials.

17. Processing Carriers

Rolock, Inc.—24-page illustrated general catalog contains descriptions of more than 100 custom-built metal baskets, trays, crates, barrels, boxes and fixtures which have been designed to solve problems for handling of metal parts during heat treatment, pickling, plating or other processing.

18. Forging Furnaces

W. S. Rockwell Co.—8-page illustrated bulletin No. 410 shows construction features and lists dimensions of important line of oil or gas fired forge furnaces for light and heavy forgings; slug, rod, bar, angle, tube, plate and billet heating; heating for flanging, pressing, shaping and bending and other such uses.

19. Electrical Equipment

Square D Co.—76-page illustrated Digest No. 129 is abridged catalog covering safety switches, service equipment, Multi-breakers, circuit breakers, panel boards, bus and feeder duct, motor control and pressure switches. Current prices, new developments and general information on complete line of products are given.

20. Concrete Hardeners

Rock-Tred Corp.—4-page illustrated bulletin describes Flint-Tred concrete floor hardener and "dust-proofer." Complete instructions are given for application of this material to all types of concrete floors.

21. Testing Machines

Riehle Testing Machines Div., American Machine & Metals, Inc.—8-page illustrated bulletin No. R-99 is entitled "Riehle Testing Machines —Instruments." Universal precision hydraulic testing machines; impact, tension, compression, transverse and hardness testers, and full range of precision testing instruments are described.

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22. Soft Metal Melting

Surface Combustion—4-page illustrated bulletin No. SC-119 is entitled "Soft Metal Melting With Surface Combustion Furnaces." Details of furnaces having capacities of 100, 500 and 1000 pounds of melted lead are given. Properties of soft metals are tabulated.

23. Torque Control

P. A. Sturtevant Co.—4-page illustrated bulletin SW describes high speed method of accurately controlling manually applied torque through use of Sensory torque wrench. Several sizes of these tools are available having capacities up to 300 foot pounds.

24. Contract Service

Sheffield Corp.—16-page illustrated bulletin is descriptive of "Sheffield Contract Services" which are available for production of machine tools, precision tools, small assemblies, screw machine parts and other equipment.

25. Mobile Cranes

Silent Hoist & Crane Co.—24-page illustrated catalog No. 58 explains advantages of all types of material handling obtained through use of Krane Kar, mobile swing boom crane. These units are available in capacities of 5000, 10,000 and 20,000 pounds. Power is supplied by integral gasoline engine. Also covered are accessories and modifications.

26. Work Rest Blades

Scully Hard-Surfacing Div., Scully-Jones & Co.—12-page illustrated bulletin No. B-44 contains data on hard-surfaced work rest blades for centerless grinding. Stellite hard surfacing is employed on portion subjected to wear. This affords resistance to abrasion, heat, erosion, corrosion, impact and thermal shock.

27. Grinder Coolant

D. A. Stuart Oil Co.—12-page illustrated booklet entitled "Grinding With Oil" discusses use of straight oils for thread, gear and other precision grinding operations. Included is chart which compares wheel markings standards of several grinding wheel manufacturers.

28. Self-Locking Nuts

Stover Lock Nut & Machinery Corp.—4-page illustrated bulletin 4j-18a lists specifications for self-locking nuts which employ spring action to grip bolt firmly and thus resist vibration. Nuts are available in ten bolt sizes ranging from ¼ to 1 inch in steel, stainless steel, brass and other nonferrous alloys with National Coarse or National Fine threads or U. S. Ordnance Tank and Automotive types.

29. Forgings

Struthers Wells Corp., Titusville Forge Div.—4-page illustrated bulletin on Titusville forgings, shafting and crankshafts outlines company's facilities for producing heavy steel and alloy forgings, line shafts, thrust shafts, crankshafts, die blocks, leveling rolls and similar forge products. Typical parts produced and shop views are shown.

30. Conveyors

Standard Conveyor Co.—28-page illustrated catalog No. 308 covers design and application of gravity and power conveyor and dispatching systems in metal working, chemical, food, beverage and other industries. Typical installations are shown and described briefly. Pneumatic tube systems are also covered.

31. Punches & Spacing Tables

Thomas Machine Mfg. Co.—16-page illustrated bulletin No. 306 presents brief specifications of complete line of multiple punches and spacing tables which are designed for use as standard equipment in structural shops, car shops, shipyards and allied industries. Wide range of capacities is available with punches rated at 150 to 1000 tons.

32. Grinding Wheels

Sterling Grinding Wheel Div., Cleveland Quarries Co.—6-page illustrated folder is descriptive of Easymounts and grinding wheels which are available in sizes and types to fit all standard makes of tungsten carbide tool grinding machines. Mounting units provide efficient means for mounting grinding wheels.

33. Automatic Thread Miller

Universal Engineering Corp.—16-page illustrated bulletin No. 1044 gives data on Model U-6 automatic thread miller which is high speed precision machine tool designed for internal and external thread cutting.

34. Radius Wheel Dresser

U. S. Tool & Mfg. Co.—4-page illustrated bulletin describes two models of radius dressers. Model 45 is adaptable to all radii up to 4½ inches. Model 24 is angle correcting radius dresser and is designed for correcting radius on wheels for grinding compound and compound complex forms.

35. Thermostat

United Electric Controls Co.—4-page illustrated bulletin No. 441T explains applications, electrical characteristics and includes technical data on type K thermostats which are designed for control of electric devices between temperatures of —120 and 600 degrees Fahr. Several ranges are available in this adjustable thermal control.

36. Tank Linings

Udylite Corp.—6-page illustrated bulletin on Koroseal tank linings describes advantages of this corrosion resistant, noncontaminating, synthetic elastic lining material which is adaptable for plating, pickling and other process tanks. Chemical resistance of linings to acids, salts, alkalis, chemical solutions and organic materials are listed.

37. Manufacturing Facilities

Triplett & Barton, Inc.—16-page illustrated booklet entitled "For Comparison" contains comprehensive information on facilities of this company for prefabrication of metallurgical, X-ray and other scientific testing. Available testing equipment and experience of company are outlined.

38. Oilers

Trico Fuse Mfg. Co.—2-page illustrated bulletin No. 28-A contains specifications and data on thermal and bottle oilers for solid, wick and waste-packed bearings. These units have clear plastic bottles so that supply of lubricant is visible at all times.

39. Hand Tachometer

Herman H. Sticht Co.—4-page illustrated bulletin No. 760 describes Model J triple range hand tachometers. Speeds from 100 to 12,000 revolutions per minute can be handled on one instrument. Accuracy is within 1 per cent of full scale reading.

40. Portable Sander

Sterling Tool Products Co.—4-page illustrated bulletin No. S-66 lists operating and service instructions for model 1000 portable electric sander. Complete details are given regarding proper use and maintenance of this reciprocating type sanding tool.

41. Electric Furnace

Thermo Electric Mfg. Co.—2-page illustrated data sheet contains information on Temco electric furnaces which offer economical, convenient and rapid means for heat treating small metal parts. Furnaces operate continuously at temperatures up to 1500 degrees Fahr. and intermittently up to 1850 degrees Fahr.

42. Friction Band Sawing

Tannewitz Works—32-page illustrated booklet discusses friction sawing of flat or formed sheet metal, nonferrous metal, armor plate, soft or hardened steel, plastic, glass and other materials. Data is prepared by Arthur A. Schwartz, Chief Tool Research Engineer, Bell Aircraft Corporation. Standard band sawing machines are described.

43. Steel Castings

Steel Founders' Society—64-page illustrated bulletin "The Steel Castings Industry" contains complete data on production and applications of steel castings in all types of civilian and war products. Technical progress, research, designing, manufacturing, patternmaking, metallurgical control and other factors entering into production of steel castings are covered in detail.

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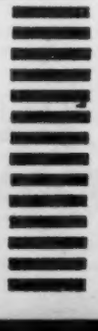


Tighter Control Seeks To Solve Steel Order Tangle

Cancellation gaps to be filled only by WPB order . . . Dead tonnage will be wiped off books . . . Raw material shortage persists

ALTHOUGH heavy directives have done much since the first of the year to crowd less important tonnage from nearby mill schedules recent action by War Production Board in requesting consumers to cancel orders for steel which for any reason they no longer need is expected to eliminate still further tonnage and thus provide space for important requirements.

Meanwhile, more rigid rules are being laid down for issuance of directives and closer control is being exerted over cancellations, mills not being allowed to fill gaps without definite approval from Washington. Some cancellations are appearing as a result of this appeal and a new cutback is being applied to programs for which it is clear that sufficient steel will not be available over first half.

Scope of the new Navy program is revealed by recent official announcement that it will include 84 combat ships of 636,860 tons displacement. In addition to aircraft carriers, light and heavy cruisers and destroyers, the program also will include several submarines. A few months ago submarine construction was almost completely halted. Reliable estimates as to steel requirements are not yet available but as construction will extend to the end of 1947 the tonnage should be produced with little difficulty. Plate mills, to which principal requirements will fall, are filled for the next few months but beyond that their schedules should be increasingly easier, affording sufficient capacity for this purpose.

Steel production fell 1 point to 95 per cent of capacity, because of the Ohio river flood. Chicago gained 2 points to 100½ per cent, highest since the week of Dec. 15, Pittsburgh was up 1 point to 90½ per cent, Detroit up 1 point to 86, eastern Pennsylvania 1 point to 91, Cleveland up 2½ points to 93½ and New England up 2 points to 92. Cincinnati, because of flood in the Ohio river, lost 15 points to 72 and Wheeling 30½ points to 68 per cent. Rates were unchanged as follows: Youngstown 92, Buffalo 90½, St. Louis 80 and Birmingham 95.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Mar. 10	Change	Same Week 1944	Same Week 1943
Pittsburgh	90.5	+1	93.5	100
Chicago	100.5	+2	101.5	101
Eastern Pa.	91	+1	94	95
Youngstown	92	None	95	97
Wheeling	68.5	—30.5	100	84.5
Cleveland	93.5	+2.5	93	92.5
Buffalo	90.5	None	90.5	90.5
Birmingham	95	None	95	100
New England	92	+2	92	95
Cincinnati	72	—15	92	85
St. Louis	80	None	74	88
Detroit	86	+1	87	91
Estimated national rate	95	—1	*98.5	*99

*Based on steelmaking capacities as of these dates.

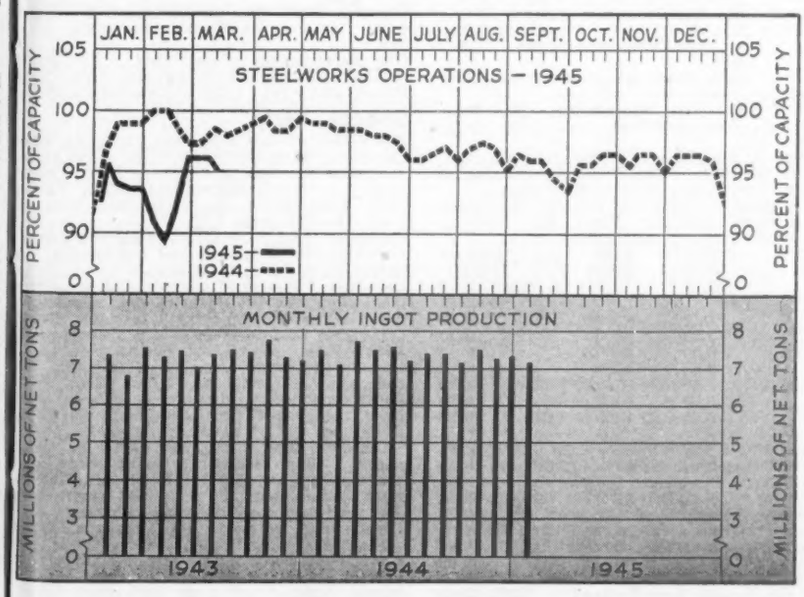
Railroad car supply is increasingly tight and cars of special type are difficult to obtain. One steelmaker has notified customers that unless delivery will be accepted in open cars the material will not be rolled, as box cars are not available in many cases. Chicago tin plate producers have nearly filled available storage room and may have to curtail production until shipping space is available.

January pig iron output showed effects of weather conditions in that month and totaled 4,945,018 net tons, compared with 4,998,757 tons in December and 5,275,852 tons in January, 1944. With the exception of November, 1944, the January total was smallest since June, 1943. January production was at 86.5 per cent of capacity.

Scrap shortage is appearing and to eke out raw material more melters are seeking additional pig iron supply and are using larger proportion of turnings in the open hearth in absence of sufficient heavy scrap. Part of the shortage is due to inability of yards to collect and prepare material because of lack of labor. To provide more pig iron some producers suggest running lower silicon foundry iron, which is more rapidly produced, to provide capacity for basic steelmaking grades. Dealers seek to avoid too large accumulations which might cause losses in case of sudden end of the European war. Prices, except for borings and turnings are at ceiling.

Deliveries are further deferred, plates in May and June, shapes in June and July, sheets in September with several large producers out of the market for third quarter, large bars September to the end of the year. On large bars over 7½ inches little can be done until 1946.

Average composite prices of steel and iron products are unchanged at levels of the past few months, OPA ceilings ruling. Finished steel composite is $57.55, semifinished steel $36, steelmaking pig iron $24.05 and steelmaking scrap $19.17.



COMPOSITE MARKET AVERAGES

	Mar. 10	Mar. 3	Feb. 24	One Month Ago Feb., 1945	Three Months Ago Dec., 1944	One Year Ago Mar., 1944	Five Years Ago Mar. 1940
Finished Steel	$57.55	$57.55	$57.55	$57.55	$56.73	$56.73	$56.73
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	36.00
Steelmaking Pig Iron	24.05	24.05	23.05	23.55	23.05	23.05	22.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	16.55

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	March 10, 1945	Feb., 1945	Dec., 1944	Mar., 1944
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.20	2.20	2.10	2.10
Plates, Philadelphia	2.25	2.25	2.15	2.15
Plates, Chicago	2.20	2.20	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.65	3.65	3.50	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.65	3.65	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.80	2.80	2.55	2.55
Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to 9/32-inch, Pitts	2.00	2.00	2.00	2.00

Pig Iron	March 10, 1945	Feb., 1945	Dec., 1944	Mar., 1944
Bessemer, del. Pittsburgh	$26.19	$25.69	$25.19	$25.19
Basic, Valley	24.50	24.00	23.50	23.50
Basic, eastern del. Philadelphia	26.34	25.84	25.34	25.34
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.19	24.69	24.69
No. 2 foundry, Chicago	25.00	24.50	24.00	24.00
Southern No. 2, Birmingham	21.38	20.88	20.38	20.38
Southern No. 2 del. Cincinnati	25.30	24.80	24.30	24.30
No. 2 fdry., del. Phila.	26.34	26.34	25.84	25.84
Malleable, Valley	25.00	24.50	24.00	24.00
Malleable, Chicago	25.00	24.50	24.00	24.00
Lake Sup., charcoal, del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.19	24.69	24.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33	140.33
Scrap				
Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$19.75	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	16.70	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke				
Connellsville, furnace, ovens	$7.00	$7.00	$7.00	$7.00
Connellsville, foundry ovens	7.75	7.75	7.75	7.75
Chicago, by-product fdry., del.	13.35	13.35	13.35	13.35

STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.

(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill. Kaiser Co. Inc. $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop., $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34; Detroit, del. $36; Duluth (bil) $36; Pac. Ports, (bil) $46. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. Ports).

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40. Detroit, del. $42; Duluth, billets, $42; forg. bil. f.o.b. Pac. Ports, $52.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54; del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—5/16 in. inclusive, per 100 lbs., $2. Do., over 5/16—41/64-in., incl., $2.15; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific Ports $0.50. (Pittsburgh Steel Co., $0.20 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Mahoning Valley 2.22½c; Detroit, del. 2.25c; Eastern Mich. 2.30c; New York del. 2.49c; Phila. del. 2.47c; Gulf Ports, dock 2.52c; Pac. ports, dock 2.80c. (Calumet Steel Division, Borg Warner Corp., and Joslyn Mfg. & Supply Co. may quote 2.35c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c.

(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.70
		4100 (.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70c; Toledo 2.80c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City. New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00c, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.

(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area or the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.65c; Granite City, base 3.75c; New York del. 3.89c; Phila. del. 3.82c; Pacific ports 4.20c.

(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific Ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 2.75c; Granite City, base 2.85c; Detroit, del. 2.85c; eastern, Mich. 2.90c; Pacific ports 3.40c; **20-gage;** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.35c; Detroit del. 3.45c; eastern Mich. 3.50c; Pacific ports 4.00c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6 40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.20c; New York, del. 2.39c; Phila., del. 2.25c; St. Louis, 2.44c; Boston, del. 2.52-77c; Pacific ports, 2.75c; Gulf ports, 2.55c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.55c f.o.b. St. Louis. Geneva Steel Co., 3.25c, Pac. ports); Kaiser Co. Inc., 3.20c f.o.b. Los Angeles.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth).

Bright basic, bessemer wire 2.60c
Spring wire 3.20c
(Pittsburgh Steel Co., 0.20c higher.)

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.80; galvanized, $2.55; Pac. ports ..... $3.30 and $3.05

Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.05c

Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.40c

Woven fence, 15½ gage and heavier, per base column ..... .67c

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	⅝	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-19	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $43.00.

•Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates, $43 net ton, base, Standard spikes, 3.00c.

•Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung	Chr.	Van.	Moly.	Pitts. base per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	...	.....
•316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.5c
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
••410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

•With 2-3% moly. †With titanium. ‡With columbium. ••Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller ..... 65½ off
Do., ⅝ and ⅝ x 6-in. and shorter ... 63½ off
Do., ¾ to 1 x 6-in. and shorter ..... 61 off
1⅛ and larger, all lengths ..... 59 off
All diameters, over 6-in. long ..... 59 off
Tire bolts ..... 50 off
Step bolts ..... 56 off
Plow bolts ..... 65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

	U.S.S.	S.A.E.
Semifinished hex	62	64
⅞-inch and less	59	60
1-1-inch	57	58
1⅛ and larger	56	

Hexagon Cap Screws

Upset 1-in., smaller ..... 64 off
Milled 1-in., smaller ..... 60 off

Square Head Set Screws

Upset, 1-in., smaller ..... 71 off
Headless, ¼-in., larger ..... 60 off
No. 10, smaller ..... 70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural 3.75c
⅞-inch and under ..... 65-5 off
Wrought Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. ... $2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	•7.00
Connellsville, foundry	7.50- 8.00
Connellsville, prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	7.25- 7.75
By-Product Foundry	
Wise county, furnace	6.75- 7.25
Kearney, N. J., ovens	12.65
Chicago, outside delivered	12.60
Chicago, delivered	13.35
Terre Haute, delivered	13.10
Milwaukee, ovens	13.35
New England, delivered	14.25
St. Louis, delivered	†13.35
Birmingham, delivered	10.50
Indianapolis, delivered	13.10
Cincinnati, delivered	12.85
Cleveland, delivered	12.80
Buffalo, delivered	13.00
Detroit, delivered	13.35
Philadelphia, delivered	12.88

•Operators of hand-drawn ovens using trucked coal may charge $7.75, effective Nov. 29, 1943.
†13.85 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	4.012[1]	5.727[1]	3.874[1]	4.106[1]	5.106[1]	5.374[14]	4.744[14]	4.144[11]	4.715	6.012[20]	6.012[20]
New York	3.853[1]	3.758[1]	3.868[1]	5.574[1]	3.690[1]	3.974[1]	3.974[1]	5.160[13]	4.613[14]	4.103[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.868[1]	5.574[1]	3.690[1]	3.974[1]	3.974[1]	5.160[13]	4.613[14]	4.103[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.705[1]	5.272[1]	3.618[1]	3.922[1]	4.272[1]	5.168[15]	4.872[25]	4.072[21]	4.772	5.816[20]	5.860[20]
Baltimore	3.802[1]	3.759[1]	3.694[1]	5.252[1]	3.494[1]	3.902[1]	4.252[1]	5.044[1]	4.852[20]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.896[1]	5.341[1]	3.696[1]	4.041[1]	4.391[1]	5.348[17]	4.841[20]	4.041[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	4.071[1]	5.465[1]	3.871[1]	4.165[1]	4.515[1]	5.521[17]	4.965[24]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.55[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.55[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.73[1]	5.26[1]	3.45[1]	3.819[1]	3.819[1]	4.90[15]	4.40[10]	3.75[21]	4.669	5.60[23]	5.75[23]
Buffalo (country)	3.25[1]	3.30[1]	3.40[1]	4.90[1]	3.35[1]	3.81[1]	3.50[1]	4.80[15]	4.30[10]	3.65[21]	4.35	5.60[23]	5.75[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.50[1]	5.00[1]	3.45[1]	3.60[1]	3.60[1]	4.90[12]	4.40[24]	3.75[21]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.40[1]	4.90[1]	3.35[1]	3.50[1]	3.50[1]	4.80[12]	4.30[24]	3.65[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.50[1]	5.188[1]	3.45[1]	3.60[1]	3.60[1]	5.027[12]	4.40[24]	3.75[21]	4.45[21]	5.60[23]	5.65[23]
Cleveland (country)	3.25[1]	.....	3.40[1]	.....	3.35[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.65[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.709[1]	5.281[1]	3.550[1]	3.700[1]	3.700[1]	5.15[13]	4.500[24]	3.800[21]	4.659	5.93[23]	5.93[23]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.265[1]	5.765[1]	3.965[1]	4.215[1]	4.215[1]	5.758[19]	5.443[24]	4.443[13]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.165[1]	5.665[1]	3.865[1]	4.115[1]	4.115[1]	5.658[19]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	6.391[1]	3.761[1]	5.291[1]	3.525[1]	3.675[1]	3.675[1]	4.975[12]	4.475[24]	4.011[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.55[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.35[1]	3.50[1]	3.50[1]	4.80[16]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.65[1]	5.15[1]	3.35[1]	3.60[1]	3.60[1]	5.381[15]	4.20[24]	3.75[21]	4.65	5.75[23]	5.85[23]
Milwaukee	3.637[1]	3.687[1]	3.787[1]	5.287[1]	3.487[1]	3.737[1]	3.737[1]	5.422[15]	4.337[24]	3.887[21]	4.787	5.987[23]	6.087[23]
Indianapolis	3.58[1]	3.63[1]	3.73[1]	5.23[1]	3.618[1]	3.768[1]	3.768[1]	5.068[15]	4.568[24]	3.98[21]	4.78	6.08[23]	6.18[23]
St. Paul	3.76[3]	3.81[3]	3.91[3]	5.41[3]	3.61[3]	3.86[3]	3.86[3]	5.407[15]	4.46[24]	4.361[21]	5.102	6.09[23]	6.19[23]
St. Louis	3.647[1]	3.697[1]	3.797[1]	5.297[1]	3.497[1]	3.747[1]	3.747[1]	5.322[15]	4.347[24]	4.031[21]	4.931	6.131[23]	6.231[23]
Memphis, Tenn.	4.015[3]	4.065[3]	4.165[3]	5.785	4.065[3]	4.215[3]	4.215[3]	5.415[15]	4.78[24]	4.33[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.65[1]	5.903[1]	3.55[1]	3.70[1]	3.70[1]	4.90[15]	4.852[24]	4.54	5.215	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	4.00[4]	5.85[4]	4.158[4]	4.20[4]	4.20[4]	5.40[26]	5.079[10]	4.60[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.35[3]	5.50[3]	3.863[3]	4.313[3]	4.313[3]	5.463[15]	4.10[10]	3.65[22]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	5.05[4]	7.20[4]	5.10[4]	4.95[4]	6.75[4]	6.15[12]	7.20[6]	5.583[20]	5.613	5.85[23]	5.95[23]
San Francisco	4.15[7]	4.35[7]	4.75[7]	6.35[7]	4.65[7]	4.50[7]	5.75[7]	6.50[15]	7.30[15]	5.333[21]	7.333	8.304[23]	8.404[23]
Portland, Oreg.	4.45[27]	4.45[27]	4.85[27]	6.50[27]	4.75[27]	4.75[27]	6.30[27]	5.90[15]	6.60[15]	5.533[15]	.....	.....	.....
Tacoma	4.35[6]	4.45[6]	4.85[6]	6.50[6]	4.75[6]	4.25[6]	5.45[6]	6.10[15]	7.05[15]	5.783[21]	.....	.....	8.00[23]
Seattle	4.35[6]	4.45[6]	4.85[6]	6.50[6]	4.75[6]	4.25[6]	5.45[6]	6.10[15]	7.60[15]	5.783[21]	.....	.....	8.00[23]

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 18 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles. [19]—100 to 749 pounds; [20]300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base. [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (seller's nearest rail)	
48% 3:1	52.80
less $7 freight allowance	

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 8612	.10 .15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9830	.28-.33	.70-.90	.20-.35	.70 .90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax in freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa. base	$26.00	$25.50	$27.00	$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Brooklyn, N. Y.,del.	28.50	.....	.....	29.00
Birdsboro, Pa., base	26.00	25.50	27.00	26.50
Birmingham, base	†21.38	†20.00	26.00	.....
Baltimore, del.	26.61	.....	.....	.....
Boston, del.	26.12	.....	.....	.....
Chicago, del.	25.22	.....	.....	.....
Cincinnati, del.	25.06	23.68	.....	.....
Cleveland, del.	25.12	24.24	.....	.....
Newark, N. J., del	27.15	.....	.....	.....
Philadelphia, del.	26.46	25.96	.....	.....
St. Louis, del.	25.12	24.24	.....	.....
Buffalo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53	.....	27.53	27.03
Syracuse, del.	27.08	.....	28.08	27.58
Chicago, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19	.....	.....	28.19
Cleveland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Detroit, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Duluth, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Erie, Pa., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Granite City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00	.....	25.50
Hamilton, O., base	25.00	24.50	.....	25.00
Cincinnati, del	25.44	25.61	.....	26.11
Neville Island, Pa., base	25.00	24.50	25.50	25.00
§Pittsburgh, del.				
No. & So. sides	25.69	25.19	26.19	25.69
Provo, Utah, base	23.00	22.50	.....	.....
Sharpsville, Pa., base	25.00	24.50	25.50	25.00
Sparrows Point, base	26.00	25.50	.....	.....
Baltimore, del.	26.99	.....	.....	.....
Steelton, Pa., base	.....	25.50	.....	26.50
Swedeland, Pa., base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34	.....	27.34
Toledo, O., base	25.00	24.50	25.50	25.00
Youngstown, O., base	25.00	24.50	25.50	25.00
Mansfield, O., del.	26.94	26.44	27.44	26.94

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. †For phosphorus 0.70% or over deduct 38 cents. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

5.00-6.50 per cent (base).....$30.50

6.51-7.00	$31.50	9.01- 9.50	36.50
7.01-7.50	32.50	9.51-10.00	37.50
7.51-8.00	33.50	10.00-10.50	38.50
8.01-8.50	34.50	10.51-11.00	39.50
8.51-9.00	35.50	11.01-11.50	40.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $24.50
Valley base 24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phos- for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one phorus content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $2 per ton, effective May 20, 1943. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942. E. & G. Brooke Co., Birdsboro, Pa., allowed $1 above basing point.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky., ...$66.55

First Quality

Pa., Ill., Md., Mo., Ky.	52.85
Alabama, Georgia	52.85
New Jersey	57.70
Ohio	46.35

Second Quality

Pa., Ill., Md., Mo., Ky.	47.90
Alabama, Georgia	39.15
New Jersey	50.50
Ohio	37.10

Malleable Bung Brick

All bases 61.65

Silica Brick

Pennsylvania	52.85
Joliet, E. Chicago	60.65
Birmingham, Ala.	52.85

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	31.95
Wire cut	29.90

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. (After Aug. 29 base price any grade $30.)

Ferroalloy Prices

Ferromanganese (standard) 78-82% l. gross ton, duty paid, eastern, entral and western zones, $135; dd $6 for packed c.l., $10 for ton, 3.50 less-ton; f.o.b. cars, New rleans, $1.70 for each 1%, or fracon contained manganese over 82% r under 78%; delivered Pittsburgh, 140.33.

Ferromanganese (Low and Medium arbon); per lb. contained manganese; eastern zone, low carbon, ulk, c.l., 23c; 2000 lb. to c.l., 3.40c; medium, 14.50c and 15.20c; entral, low carbon, bulk, c.l., 3.30c; 2000 lb. to c.l., 24.40c; edium, 14.80c and 16.20c; westrn, low carbon, bulk, c.l., 24.50c, 000 lb. to c.l., 25.40c; medium, 5.75c and 17.20c; f.o.b. shipping oint, freight allowed.

Spiegeleisen: 19-21% carlots per ross ton, Palmerton, Pa. $36; 16-9%, $35.

Electrolytic Manganese: 99.9% plus, ss ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromi-m, max. .50% carbon, eastern ne, per lb. contained chromium ulk, c.l., 79.50c, 2000 lb. to c.l. c; central, 81c and 82.50c; westrn, 82.25c and 84.75c; f.o.b. shipg point, freight allowed.

Ferrocolumbium: 50-60%, per lb. ntained columbium in gross ton s, contract basis, R.R. freight owed, eastern zone, $2.25; less-n lots $2.30. Spot prices 10 cents r lb. higher.

Ferrochrome: High carbon, eastern ne, bulk, c.l., 13c, 2000 lb. to l., 13.90c; central, add .40c and 5c; western, add 1c and 1.85c—gh nitrogen, high carbon ferro-hrome: Add 5c to all high carbon ferrochrome prices; all zones; **low carbon** eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65c for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. to c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. **Prices** per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom. 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed, 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-3% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium; 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed; 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western, spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% Max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max., sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract, ton lots, $1.89, less, $2.01, eastern, freight allowed; $1.903 and $2.023 central, $1.935 and $2.055 western, spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract. 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max., sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate, to which equivalent of St. Louis rate will be allowed; spot, up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide, approx. 10% and calcium oxide approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed, per pound vanadium oxide contained; contract, carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract, ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309, Central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20%, mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 13.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.), per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c, eastern, freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Manganese Metal: (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c, 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western, 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 c.l., 35c; central, 34.25c and 36c; western, 34.55c and 38.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99% per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40; eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15%, net ton to carload, 8c lb. F.O.B. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern, contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

Simanal: (Approx. 20% each Si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 158 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Bundles	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Machine Shop Turnings	13.75
Mixed Borings, Turnings	13.75
Shoveling Turnings	15.75
No. 2 Busheling	15.50
Billet, Forge Crops	21.25
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turning	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	11.50-12.00
Short Shovel Turnings	13.50-14.00
Mixed Borings Turnings	11.50-12.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	12.50-13.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06•
No. 2 Heavy Melt. Steel	14.06•
No. 1 Bundles	14.06•
No. 2 Bundles	14.06•
No. 1 Busheling	14.06•
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel, Turnings	11.06•
Chemical Borings	13.06•
Low Phos. Clippings	16.56•
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

•Inland base ceiling; Boston switching district price 99 cents higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Mach. Shop Turnings	14.00
Short Shovel, Turnings	16.00
Mixed Borings, Turnings	14.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	21.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	14.00-14.50
Cast Iron Borings	13.00-13.50
Machine Shop Turnings	12.00-12.50
Low Phos. Plate	21.00-22.00

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	11.00-12.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet, Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails, Random	18.50
Rerolling Rails	20.50
Angle, Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	16.25-16.75
No. 3 Galv. Bundles	14.25-14.75
Machine Turnings	9.00- 9.50
Mix. Borings, Sht. Turn.	9.50-10.00
Short Shovel Turnings	9.50-10.00
Cast Iron Borings	9.50-10.00
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	13.00-13.50
Short Shovel, Turnings	16.25
Mixed Borings, Turn.	13.00-13.50
Cast Iron Borings	14.00-14.50
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	9.00- 9.50
Cast Iron Borings	10.00-10.50
Short Turnings	11.00-11.50
Low Phos Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	13.50-14.00

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	$17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	9.50-10.00
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25

(Cast grades f.o.b. shipping point)

Stove Plate	18.00

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	7.50- 8.00
Shoveling Turnings	9.50-10.00
Cast Iron Borings	9.50-10.00
Mixed Borings, Turnings	8.50- 9.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal. Bundles	12.00
Machine Turnings	4.50
Mixed Borings, Turnings	4.00
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	6.90
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut Structural, Plate, 1", under	18.00
Alloy-free Turnings	7.50
Tin Can Bundles	14.50
No. 2 Steel Wheels	16.00
Iron, Steel Axles	23.00
No. 2 Cast Steel	15.00
Uncut Frogs, Switches	16.00
Scrap Rails	16.00
Locomotive Tires	16.00

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low-grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.), 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Prices for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239. 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American, bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224-lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: OPA ceiling prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz., $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193. Open market, spot, New York, nominal for 50 to 100 flasks; $165 to $168 in smaller quantities

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb.. del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weather-proof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.
Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c, 100-199 61.00c.
Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls.33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more, plant scrap only. Segregated solids: S-type alloys (2S, 3S, 17S, 18S, 24S, 32S, 52S) 9.00c, 10.00c, 10.50c; All other high grade alloys 8.50c, 9.50c, 10.00c; low grade alloys 8.00c, 9.00c, 9.50c. Segregated borings and turnings: Wrought alloys (17S, 18S, 32S, 52S) 7.50c, 8.50c, 9.00c; all other high grade alloys 7.00c, 8.00c, 8.50c; low grade alloys 6.50c, 7.50c, 8.00c. Mixed plant scrap, all solids, 7.50c, 8.50c, 9.00c; borings and turnings 5.50c, 6.50c, 7.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.53c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more: New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 186

With heavy directives loading mills beyond capacity War Production Board has asked buyers to review their steel orders and cancel what may not be needed. Gaps in rolling schedules that may develop from this action will be filled by WPB with needed tonnage for prompt delivery. Current promises are for September and October by most mills. Galvanized sheet promises range from August to the end of the year.

New York—In view of heavy directives placed since the first of the year it would appear that much tonnage on order but no longer needed because of changes in the war program, would be shaken out and if not cancelled outright would be pushed ahead to a point where it would have little bearing on present schedules.

However, it is the opinion of various trade observers that nearby schedules will be loosened up as a result of the request of the War Production Board for consumers to review the steel orders they have placed and then cancel what may not be needed. It is pointed out that tonnage has been placed well into the future, with estimates as to the more distant requirements subject to charges not yet reflected on the order books of the producers. Many of these orders were placed some time ago so that there might well be question as to the need for tonnage which might be up now or in the near future for delivery, it is said.

It is still too early for this request of WPB to be reflected in mill schedules, and when openings as a result of cancellations do appear they will be filled by directive tonnage, with the decision entirely up to WPB officials. Meanwhile, most producers are quoting hot and cold-rolled sheets for September and October, with little general change in the situation from a week or so ago, although, admittedly, more tonnage is being booked by most producers than they are able to ship. In certain cases certain producers are sold into November and December on these grades. Galvanized sheet promises range from August until late in the year. In fact, in at least one case, some tonnage is available in July on widths 36 inches and narrower and on 16-gage and heavier.

Boston — While supplemental orders for narrow cold-rolled carbon strip are appearing, in the main new buying shows signs of slackening. September schedules with more producers are filled, however, and demand for strip from warehouses to meet wanted requirements is heavier. Distributors are frequently unable to supply all the tonnage, notably on larger inquiries which range from 50 to 75 tons. Hot mill deliveries to rerollers have slipped back a month in more cases. Among rare cutbacks, involving bright annealed strip, is on land mines, mostly in the Midwest. Sheet deliveries have lengthened more into third quarter with mills who until recently had scattered openings for August. Heavier gages of black sheets are not as critical as lighter stock, No. 18-gage and under with most producers. and some tonnage for August is still available. Subcontracting by Springfield armory for the revised Garand rifle program is heavier than for the first with more shops affected. On the other hand, a cutback in production of one type of torpedo at the Newport, R. I., and two other plants, is in the offing.

St. Louis—Sheet demand is increasing with numerous WPB directives pushing deliveries far ahead. Schedules for Controlled Materials Plan are being seriously disrupted. Demands from seaboard points are coming to this market, as usual sources are unable to meet needs. Strip demand increases and military needs press hard. Directives are numerous and cause delay on scheduled shipments.

Cincinnati — An Ohio river flood caused shutdown of steelmaking and rolling departments of the Andrews Steel Co., Newport, and predictions are that two-weeks' production will be lost. Directives are still piling tonnage on sheet mills although not in recent volume. Carryover is large, and backlogs extended almost to the end of the year.

Pittsburgh—The anticipated freeze order on all sheet items has been made effective and sheet mill operators henceforth will report to WPB any gap which may develop through cutbacks or cancellation. The mill time made available through such reductions in the load will be reassigned by WPB to the most pressing tonnage unplaced at that time. Because of the heavy overload tonnage now pending, little new business is being accepted. Instead, every effort is being made to cut down tonnage now on books in order to reduce carryovers as far as possible. Most sheet mills are now 15 to 30 days behind schedule, with some units farther back than that.

Cleveland—Volume of new orders has slackened somewhat, due to extended delivery and the fact that many consumers have already covered for their requirements. Sellers report a falling off in number of directives. Carryover tonnage is increasing, however, and is expected to reach record proportions by the close of the current quarter. In an effort to clear mill books of all but most pressing war obligations, the industry has been asked by WPB to wipe off books all orders invalidated by adjustments in war procurement programs. Large tonnages of steel, chiefly sheet and strip, are awaiting placement, WPB officials state. However, no action can be taken until mill schedules are cleared to make room for them.

Stran-Steel Division, Great Lakes Steel Corp., Detroit, and International Derrick & Equipment Division, International-Stacey Corp., Columbus, O., will fabricate 2020 warehouse structures for the Navy, requiring approximately 12,500 tons of galvanized sheets and a substantial tonnage of light shapes.

Philadelphia—Shell containers, bomb fins, bomb clusters and heavy trucks account for substantial portion of sheet and strip tonnage now being placed here by consumers, with jobbers specifying to the limit of their ability for the next several months. Galvanized is in strong demand, although some cancellations have been made recently by range boiler manufacturers as a result of restrictions by Washington. Little hot or cold-rolled tonnage is now available before September and several large producers are practically out of the market for third quarter, at least one having nothing to offer before January. Galvanized sheet promises range from August until well into next year.

Chicago — Reflecting the extremely tight situation in sheets and strip, WPB has frozen for use at its discretion any mill open space arising from cancellations. It is understood the government has large requirements of sheets it has been unable to place. Hot-rolled sheets are in September; hot-rolled pickled in December; strip mill sizes September; cold-rolled sheets November and galvanized sheets December. Hot-rolled strip, narrow and wide, November, and hot-rolled pickled December.

Steel Bars . . .

Bar Prices, Page 186

Tightness of the steel bar market, a result of heavy demand for war purposes, aggravated by numerous directives, has produced a situation where an effort is being made to rearrange schedules. Shell and rocket steel is most in demand and mills are being given much heavier tonnages for second quarter, in some cases almost doubling those of first quarter. Deliveries are constantly being deferred.

Pittsburgh—It is reported that a comprehensive study is being made of the entire bar situation and it is probable the result will be elimination of some directives and a return to the CMP basis. The CMP practice, which had been operating smoothly, gradually fell into disuse as new business declined during the latter part of 1944. As important programs became critical, directives were issued to insure delivery of required steel against these programs. This policy succeeded until the number of directives got out of hand and in effect the bar market returned to the situation which it faced during the early days of the War Production Board when priorities succeeded priorities until the whole system became meaningless. There is now enough tonnage in hot-rolled bars to keep all units of the industry operating at capacity for 9 to 12 months, barring cancellations and cutbacks.

Chicago—Steadily rising demand for shell and rocket steel creates additional pressure on bar schedules. Urgency is indicated by the fact that one producer's production directive for June is 80 per cent higher than for January. Second quarter output of shell and rocket material for this maker is expected to be 60,000 tons greater than in first quarter, providing WPB assists in securing additional equipment and manpower. As to deliveries, carbon bars have advanced from May to August, with one maker able to take a little business in July; quality bars are in November and December, depending upon size. Electric furnace alloy bars have moved from April to August, and open-hearth from June and July to September.

Cleveland—War steel requirements for shell, large trucks, tanks, and heavy aircraft engines are taxing bar mill production, forcing delivery promises well into third quarter and in a few instances into 1946. Little alloy steel is available in first half. The February carryover was the largest in months and is said to be increasing. Production schedules are no longer disrupted to the extent reported during February by directives. However, new business continues to exceed output.

Boston—Except for scattered new inquiries, bar buying has subsided, with carbon less active than alloys. Pressure for tonnage is strong, notably from warehouses, which in turn are filling a sub-

stantial volume of new inquiry where inventories permit. Most fabricators have covered into third quarter and only if downward revisions are forthcoming in existing contracts is there much likelihood of reduction. Several shell contracts have yet to get underway and meanwhile most bar users have increases or extensions in current backlogs. In smallest sizes of carbon bars there are a few openings for late second quarter.

St. Louis—Pressure for bar production is increasing and only directives are now being scheduled. Cutbacks in some types of bombs, which had been expected to ease the bar situation, have been more than offset by increases in other types.

Philadelphia—Bar demand locally has increased as the shell program broadens and increasing specifications come out for rockets, bomb parts and gun components. Railroad specifications are lighter as a result of cutbacks in some equipment schedules, but this is offset by heavier releases for ship work and increased tonnage from forgers. Some important producers are now booked solidly into September on all sizes of carbon bars. Some can do a month better on smaller sizes, while others are booked for practically the remainder of the year on large rounds, 7½ inches and over.

Steel Plates . . .

Plate Prices, Page 187

Gradual easing in pressure for plates is evident, though not to the extent expected. Naval vessels, railroad work and tank construction contribute to volume of new demand, though not sufficiently to offset decline in merchant shipbuilding. Some deliveries can be obtained in May, though most mills can offer no better than June.

New York — Plate buying is well sustained at the rate of the past three or four weeks, although down somewhat from January. Navy work has bolstered demand recently and there is more of this to place, with additional tonnage for railroad equipment for export. Tank fabricators report some improvement, with tonnage now being figured for several high octane gasoline refineries and with a little work being figured for lampblack manufacturing projects now going ahead in connection with the rubber program. A few water tanks also are being figured in connection with some large industrial programs, such as are now being developed by the DuPont interests. However, reflecting limitations on civic projects, the volume of tank work falls far short of engaging capacity and in some important instances, tankmakers report a falling off in other fabricating lines, such as has been usually coming to them through subcontracts.

While some producers still have tonnage available for delivery in May, capacity is well booked up to June in most cases.

Boston — Repairs to landing craft are nearing completion; one district yard is expected shortly to start on six small tankers, postponed because of the repair program. However, indications are as much steel as possible for these boats will be taken from inventory. Shipyards with current contracts nearing completion are generally clearing up inventories. Navy ships recently placed with New England yards will require approximately 35,000 tons of steel, largely plates. While demand for 3/16-inch floor plates is substantial, smaller requirements for pontoons and maritime ships eases overall volume, although warehouses still lack floor plates for a sustained industrial inquiry. Railroads are buying sparingly, but the Worcester carbuilding shop volume is maintained for rapid transit street cars and vital transportation units, exclusive of railroad passenger cars.

St. Louis — Plate pressure is less and producers believe it will be materially eased by midyear in absence of further shipbuilding demand. Plate capacity is expected to be shifted back to sheets sufficiently to relieve some present strain on sheets.

Chicago — Of all steel products, plates are suffering less in delayed deliveries, reflecting the declining activity of shipbuilders. One district platemaker can supply wide sheared plates in May, narrow in July, and universal plates in June. For another producer, sheared plates are in October and universal in August.

Pittsburgh — Producers are receiving some orders for plates for warships recently awarded by the Navy. Some 40,000 tons of plates are involved in warships already awarded and additional inquiries are now out for auxiliary craft for the Navy, as well as some additional Maritime Commission ships, principally tankers. Slowdown of shipments to yards building ships has been sharp in recent weeks and the condition of plate order books now is characterized as easy. Most plate orders now being placed can be

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delivered from late second through third quarter. This represents a delay of 30 to 60 days from previous delivery promises.

Tubular Goods . . .

Tubular Goods Prices, Page 187

Boston — Tubing, notably seamless, has tightened and deliveries are extended deeper into third quarter on more sizes. Heavy orders for shell steel are accompanied by a spurt in boiler tubes and sustained buying of alloy tubing by aircraft shops. Butt and lap-weld pipe deliveries for late second quarter are general, but distributors are pressing for material to balance sizes. While consumer demand for merchant steel pipe is not heavy, some distributors have allowed inventories to sag. Sprinkler equipment shops are placing some fair orders; Grinnell Co., Providence, R. I., has automatic sprinkler protection contracts for Normoyle Field, San Antonio, Tex., at $292,900 and Rossford Ordnance depot, Toledo, O., at $454,841, estimated. Inquiry for steel valves is heavy with the Navy distributing contracts in excess of $1 million.

Cleveland — Production of cast iron soil pipe and fittings declined from about 565,000 tons in 1941 to 165,000 last year. At present, inventories of wholesalers and manufacturers have been reduced to mere odds and ends, and supply is seriously short. Soil-pipe foundries reported order backlogs as of Dec. 31 of 95,000 tons of soil pipe and fittings, and backlogs are growing at the rate of 10,000 tons a month. A conservative estimate of overall 1945 requirements totals 225,000 tons.

Makers of mechanical tubing are getting more business than they can handle, reflecting heavy requirements for the rocket program and additional demand from the petroleum and railroad industries. Requirements for merchant pipe are relatively light.

The Metropolitan Eastern Corp. has filed an application with the Federal Power Commission to build and operate an 825 mile 18-inch natural gas pipeline extending from East Texas gas field to Ohio.

Wire . . .

Wire Prices, Page 187

New York—With no slackening in orders major requirements for tire, rope and communications wire, still heavier, are pushing additional CMP tonnage out of schedule. Included is considerable spring wire into third quarter. Recent losses in semifinished production are showing up at expense of some essential tonnage and heavier carryovers. After maintaining output on major programs mentioned there is less steel for other products. Despite tightness in semifinished, wire mills, with other producers, have been asked to contribute any ingot or billet tonnage available for the war program and at least one offers some billets. A slight increase in the nail directive is likely. Warehouses are especially short of nails and most other wire mill products. For lend-lease 1000 tons of telegraph wire has been placed outside ranges in which capacity is crowded.

Boston—Viewed with increasing skepticism is considerable displaced tonnage in wire mill backlogs. With delivery schedules steadily lengthening and carryovers heavier any major revision in wire requirements would make for repetition of confusion caused by cutbacks and changes late last summer, in the opinion of some. Eventually this is forthcoming, but when is conjectural. Meanwhile volume placed with most mills is unabated. Delivery pressure is strong.

Cleveland — New order volume has slackened somewhat because producers have not been able to meet desired delivery. However, demand is in excess of shipments and order backlogs are further extended. Pressure for prompt delivery on communication wire is more acute, with requirements well in excess of output.

Increase in production of wire bale ties to meet heavy spring demands is being considered by WPB. However, this is expected to be difficult for 85 per cent of bale ties are produced in No. 1 and 2 labor areas. Industry spokesmen have recommended that a small reserve of nails be established to meet urgent warehouse needs.

Tin Plate . . .

Tin Plate Prices, Page 187

Pittsburgh—Uncertainty regarding export tonnage for second quarter is only one of the questions which must be cleared up before second-quarter tin plate program is definitely established. Most producers have accepted business on the basis of continuing production at current levels, approximately 275,000 tons per month. In the absence of definite commitments on export plate,

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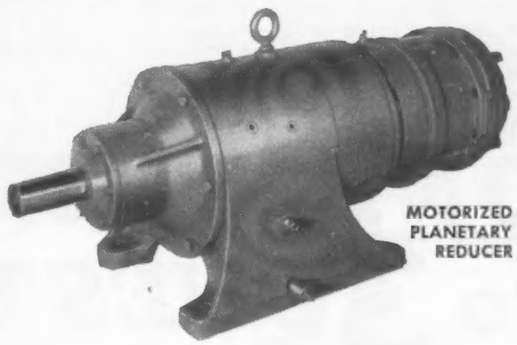

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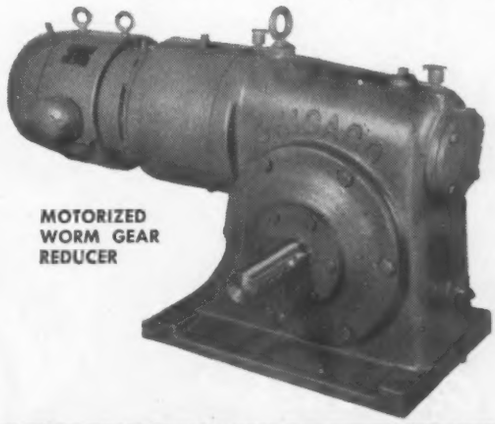

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this tonnage has been filled by domestic buyers. Some mills report substantial domestic business is available and considerable tonnage over present quotas could be taken if they desired. There is still considerable talk and little action regarding tonnage involved in an overall steel program for France and covers many other steel products in addition to tin plate. This is a Lend-Lease operation and the political implications of the whole program are such that developments have been exceedingly slow. Tonnages involved, however, are an open secret. In the absence of definite commitments, it would be folly to speculate on the final settlement, but if present indications prove to be correct, the French tonnage will be the largest export program since the start of the war. In domestic placements for second quarter producers report an expanding tonnage of electrolytic plate and better demand for bonderized black plate.

Boston — Overdue tin plate deliveries have improved; late last month one producer had piled up 276 carloads for shipment with but six available. Demand in this area is seasonally light; can fabricating plants are on spasmodic schedules and one in Boston district is down. Fish and sea food containers took 99,428 tons last year compared with 82,986 tons, 1943. All-metal cans shipped by manufacturers required 2,071,610 tons of steel, exclusive of 2558 tons of wire for keys and handles.

Chicago—Supply of box cars for moving tin plate from mills to customers has improved only moderately and the situation still could become critical. Tin plate makers are exhausting storage space and if this space is completely filled tin mill operations will have to be reduced. One local producer has made more space available, which has added about ten days to operations, but difficulty was experienced in getting cars to effect the transfer of plate from mill to storage. Such arrangement also increases costs. Production schedules are filled through second quarter.

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Rails, Cars . . .

Track Material Prices, Page 187

New York—Domestic freight car buying has dropped sharply, with little reported so far this month. This is a further accentuation of the trend which resulted in a drop in February to 1750 cars from a total of 7200 in January. Considerable export business is still pending, especially for France, on which no action has yet been taken.

Included in domestic lists pending are 500 box cars for the Chicago, Rock Island & Pacific, on which action is expected shortly. Awards include 15 fifty-ton special steel flat cars for the International General Electric Co., which will be built at the Berwick, Pa., plant of the American Car & Foundry Co., New York.

A comparatitve statement on domestic freight car awards follows:

	1945	1944	1943	1942
Jan.	7,200	1,020	8,365	4,253
Feb.	1,750	13,240	350	11,723
March	.....	6,510	1,935	4,080
April	.....	4,519	1,000	2,125
May	.....	1,952	870	825
June	.....	1,150	50	0
July	.....	795	4,190	1,025
Aug.	.....	3,900	8,747	0
Sept.	.....	400	6,820	1,868
Oct.	.....	2,425	5,258	0
Nov.	.....	1,065	870	0
Dec.	.....	16,245	2,919	135
Total	.....	53,221	41,355	26,025

Chicago—While mills have not been instructed to remove rails and other products for freight cars from rolling schedules in second quarter, in line with WPB's reduced allocation of steel to ODT for this period, such instructions are looked for shortly. Rails are expected to be cut about 30 per cent and materials for cars about 40 per cent. The cutbacks are needed quickly if some of the steel already in schedules is not to be rolled. Due to lateness of the reduction, car builders may find stocks out of balance, with shortages in some items to delay cars already started. Although the cancellation of domestic cars for second quarter will be heavy, the space probably will be more than taken up by scheduling of army cars for Russia.

Structural Shapes . . .

Structural Shape Prices, Page 187

New York—Award of two high octane gasoline refineries through the M. W. Kellogg Co., New York., features structural buying. Sixteen hundred tons for the Standard Oil Co. of Indiana for erection at Whiting, Ind., have been awarded the American Bridge Co., Pittsburgh and 1200 tons for the Gulf Refining Co. for erection in Philadelphia, have been placed with Belmont Iron Works, Eddystone, Pa. Action on three additional refineries is pending. Other awards in

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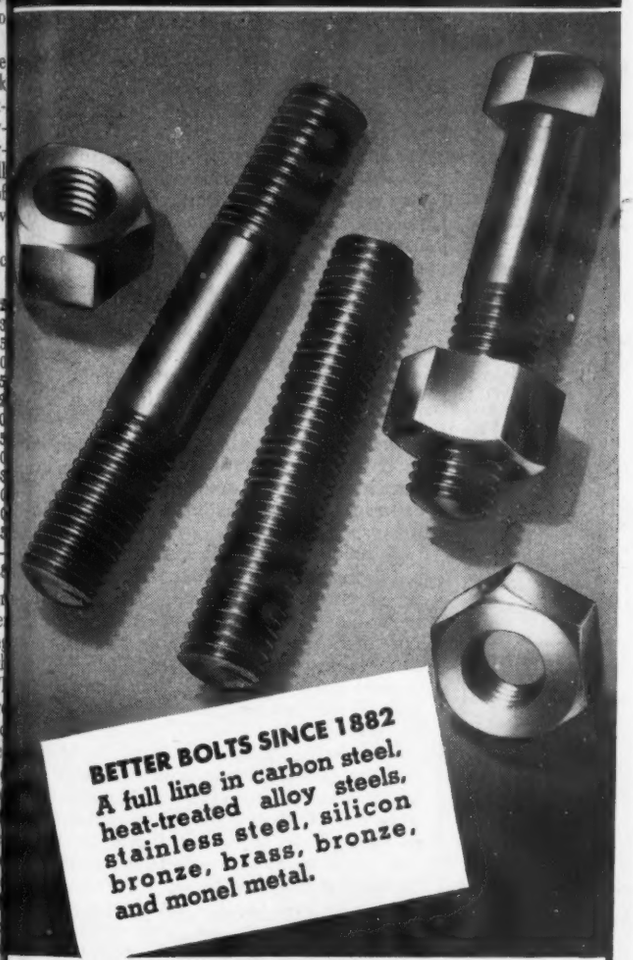

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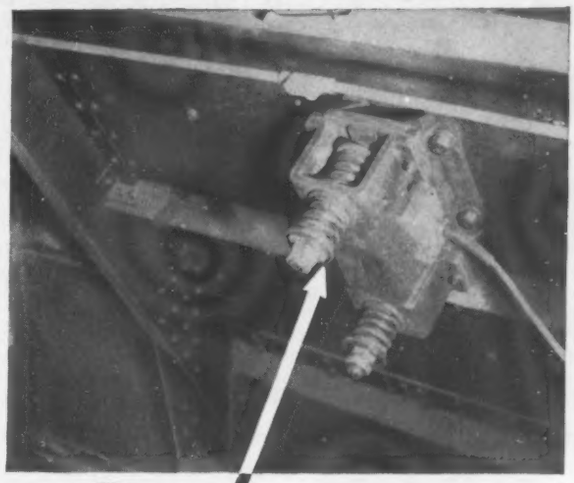

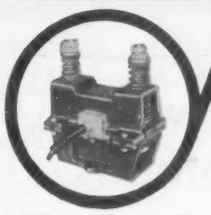

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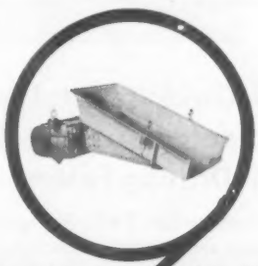

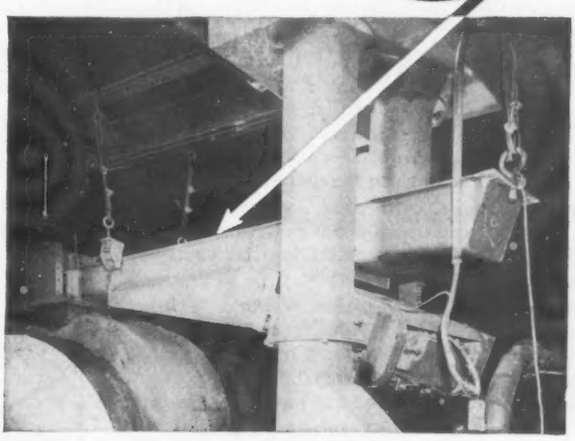

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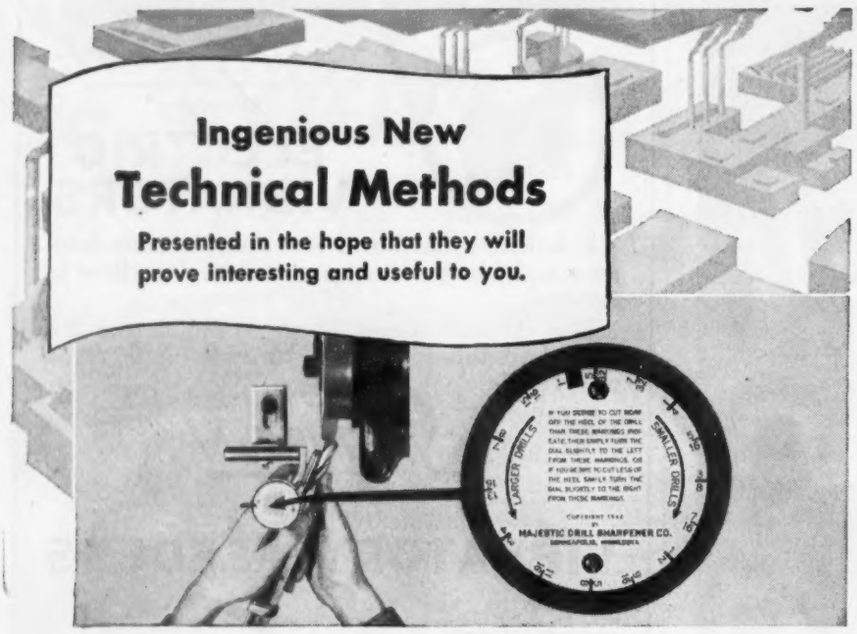
clude 200 tons for a warehouse addition for the Santini Warehouse Co. at Third avenue and 189th street, Bronx, New York.

Boston—Five weeks, three for fabricating and two for erecting, is tentative schedule for the 1400-ton contract for a forge shop to be operated by United Shoe Machinery Corp., Lowell, Mass., in connection with 105-mm. shell production. With the steel covered by directive, tonnage is being fabricated at two American Bridge Co. shops and erecting schedule calls for a 70-hour week. Except for this job structural activity is slack, although better than 2000 tons have been placed by Boston contracting engineers for ordnance plants in the midwest. Shipyard buying, barring additional navy needs, tends to slow down. Bridge inquiry is lacking; cable repair contract for a Bath, Me., span went to Bethlehem Steel Co. Surveys indicate plant modernization and expansion by pulp and paper companies will be large after the war; four in Maine will spend more than $5,000,000.

Cleveland—Structural fabricators are fairly busy working off backlogs. Inquiries are limited to tonnages well under 100 tons, although a number of projects involving considerable tonnage are reported in the planning stage. Shape mills are scheduled almost entirely on war contracts, with little tonnage available for civilian construction. Carnegie-Illinois Steel Corp. is said to have booked 12,000 tons of piling from U. S. Engineers at Columbus.

Chicago—New high octane gasoline plants, tire plants and railroad bridge requirements constitute chief demand for structural steel. Individually, these call for 1000 to 2000 tons, but the aggregate is not heavy. Current position of mills requires that these urgent jobs be covered by directives to insure early delivery, and because of this some fabricators do not figure. Currently, large standard shapes stand in July delivery, and smaller sizes in August. Navy Bureau of Yards and Docks has an inquiry for 6000 tons of sheet piling, with placing contingent upon earliest delivery.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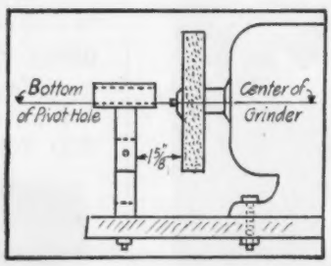
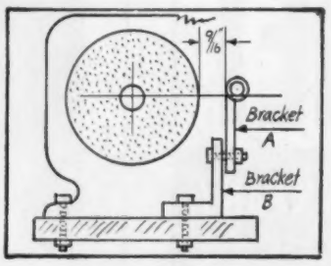


Front view of grinder



Side view of grinder

You can get complete information from Ameraco Industrial Specialties, 122 S. Michigan Ave., Chicago 3, Ill.

Z-59

Pig Iron . . .

Pig Iron Prices, Page 189

Melters who suffered from slow pig iron shipments during the railroad tieup are receiving sufficient iron now in most instances. Buying for second quarter has started and shipments are being scheduled to avoid conflict with the 30-day inventory order. Iron piled at furnaces during the snow blockade has been loaded and shipped as car supply improved.

New York—Pig iron consumers are in slightly better position with respect to immediate needs, although a number are still operating on a hand-to-mouth basis. Lack of cast scrap is complicating the position of many, who are endeavoring to make up in pig iron what they can not get in scrap. Meanwhile, new buying is getting under way for second quarter, especially for April. Where there is buying for the entire quarter, arrangements are made for shipments so as not to violate the 30-day inventory regulation.

There has been a spurt in coke demand for delivery this month, which sellers ascribe in part to the possibility of a strike in the coal mines this spring and in part to an effort to get stocks in before higher prices develop as a result of contract negotiations in the mining industry.

Buffalo—Unless war demand changes pig iron producers expect second quarter shipments at least to equal those of first quarter. Sellers are concerned over possible cancellations if the war in Europe ends. Better car supply has improved the situation and iron piled during the railroad tieup has been completely cleared.

St. Louis—Pig iron supply is tight but melters are being provided sufficient for needs. Inventories are considerably below the 30-day allowance. Efforts to provide more labor for foundries have not yet been effective and production of castings is held low.

Boston—Steelworks and foundries still work on a narrow margin as to raw material supplies, including fuel. Only by alternating coal and oil has one mill avoided power shutdown. Second quarter pig iron covering is moderate despite inventories below normal. In this the 30-day limit is some factor. Slight increase in melt is also apparent in scattered instances and shortage of cast scrap accounts for part. Volume of first quarter carryover will be less than expected with most furnaces, in view of previous transportation difficulties. New York barge canal will be open April 2.

Cincinnati — Buying of pig iron for second quarter is slow and almost always with old contacts. Principal attention is on deliveries. Often tardy because of rail congestion, shipments are being further delayed by an Ohio river flood. Melt

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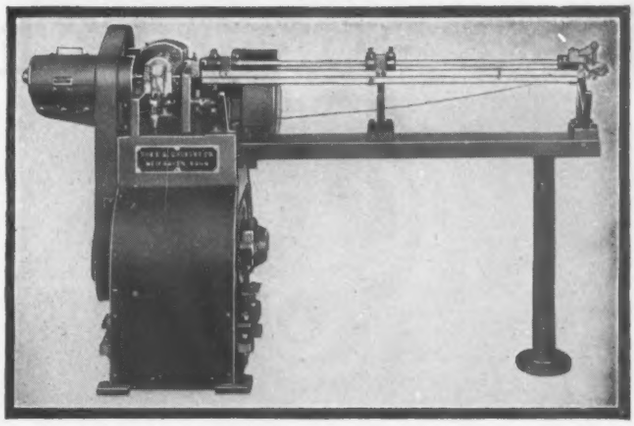

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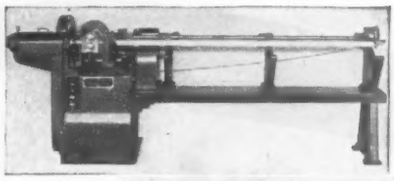

Type 1A
1/16"—3/16"
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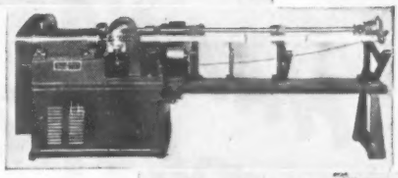

Type 2A
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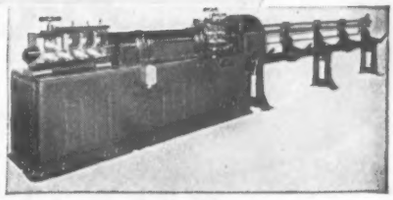
Type 3A
3/16"—3/8" Dia.
Type 4A (not shown)
3/8"—5/8" Dia.



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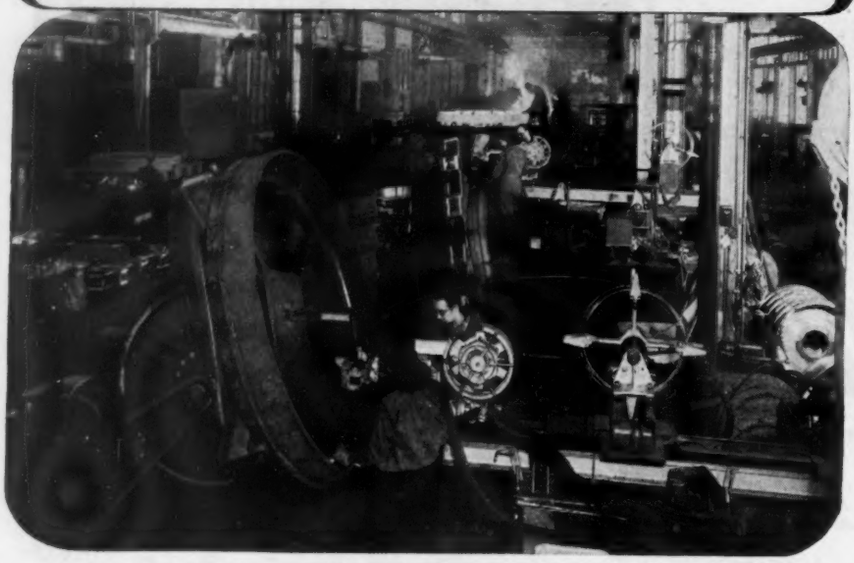

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in the district is down sharply, also on account of the flood, which has shut down a number of foundries. Some others may be hit by hampered shipping because stocks, almost without exception, have been low.

Cleveland—Improved freight service has materially eased the tight situation in pig iron although cars still are short. Pig iron output is currently at the highest level in months, with 13 out of 14 blast furnaces in this district active. Sellers are still suffering from manpower shortage. Foundry operations have shown moderate upward tendency lately.

Philadelphia — Inquiries for second quarter pig iron are heavy, many foundries asking twice as much as originally requested. This is ascribed to extreme scarcity of cast scrap. Various foundries have practically no scrap and are pressing pig iron producers for tonnage. As basic consumers also are hard pressed for pig iron, producers are in as tight a position as they have been in months. To cope with this situation some pig iron sellers plan a run of low silicon foundry iron, No. 3 foundry, which can be produced faster. Foundries prefer the higher grade but producers believe this program would provide more iron, which foundries could at least use and still allow some diversion of capacity to basic.

Scrap . . .

Scrap Prices, Page 190

Buffalo—Depleted yard stocks are not being built up, labor being short and dealers fearing to accumulate much inventory for fear of a sudden change in the market. As a result dealer stocks are low and heavy steelmaking material is scarce. Turnings supply is heavy and machine turnings have declined to a range of $13 to $13.50. Short shoveling turnings still command ceiling from ferroalloy plants at Niagara Falls, without commission. Mixed borings and turnings and cast iron borings are below ceiling.

St. Louis—Scrap offerings continue tight, with material from railroads and shipyards under WPB allocations. Labor and weather continue to limit collection and preparation, efforts to shift workers giving little result. Mill reserves remain at five to six weeks. Prices are at ceiling except for machine turnings.

Cincinnati—Shortage of labor and cars hold back iron and steel scrap so that heavy grades, especially where preparation is necessary, are scarce. Inventories of mills are being cut, but these interests indicate no real pinch. Foundries, however, are eager buyers. Prices, except on borings and turnings, are at ceiling with strong undertone.

Los Angeles—Scrap dealers are turning more to nonferrous collection and preparation. Mill buyers are pressing for greater yard activity in steel grades. Low prices and shortage of labor are factors. Shipyard scrap continues to be shipped eastward and some dealers also are shipping to the middle west.

Seattle—Scrap supply is sufficient but no shipments are being made outside as local demand takes all offerings. Some prepared scrap is being shipped here by rail from Vancouver, B. C. Some shipments east are being made from Portland and other Coast points. Price is firm at $13.50 for heavy melting steel, $1 under ceiling. Labor at yards is scarce.

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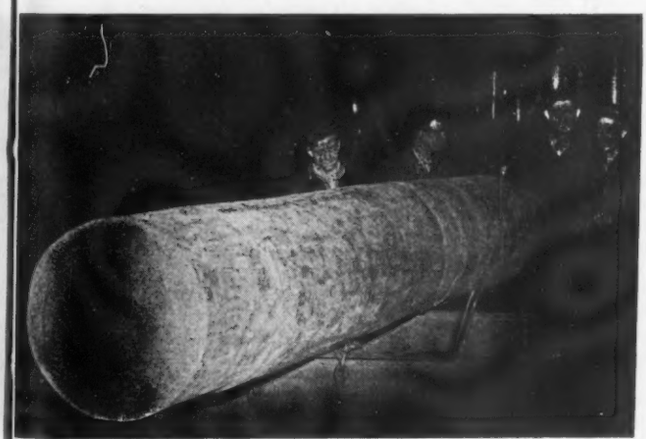

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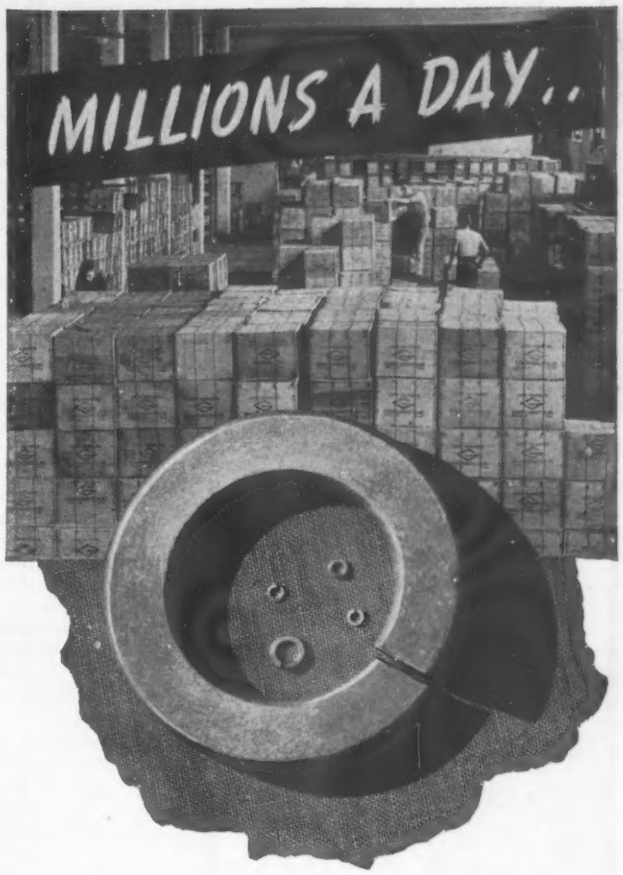

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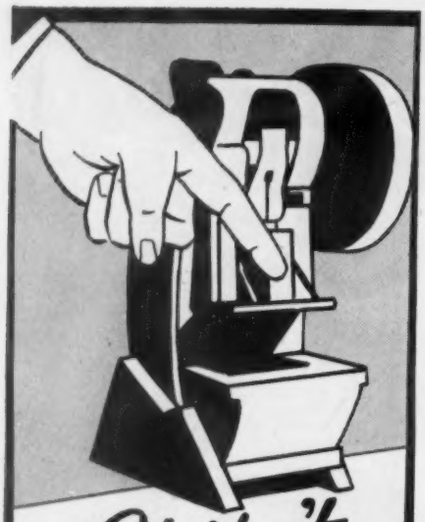

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Cast scrap is in heavy demand but foundries are able to obtain all they need at ceiling.

Boston—What little cast scrap is available is not coming out, because of manpower, and shortage in that grade is critical. Probably less than half a dozen shops in the entire area have 60-day reserves. Foundries are using more short steel and some are buying cast on a day to day basis. Heavy melting is also tight, considerably more so than lighter grades. Short shoveling turnings are freer and some consumers have slowed shipments temporarily.

Cleveland—Scrap dealers are reluctant to accumulate too much tonnage as a precaution against a sharp price reduction likely to follow the European war. Mills report further reduction in scrap inventories, but the situation is not considered critical. However, in the Youngstown district good open-hearth grades are so scarce that mills are reportedly using electric furnace scrap in open-hearth operations. Industrial scrap is plentiful, but this material is mainly turnings, and also is being used more extensively in the open-hearth. Railroads are behind schedule in preparing open-hearth scrap from reconditioning operations. There is considerable scrap in yards but dealers are short of manpower.

Philadelphia — Scrap sellers report somewhat better movement in heavy melting steel but assert they are pressed for every ton they can supply. To augment stocks steel mills are taking an increasing tonnage of turnings, which are in fairly easy supply. Some open-hearth operators are using turnings to the extent of more than 25 per cent. Heretofore it has been considered economically undesirable to use more than 15 per cent with general practice to use less. Low phos scrap is more plentiful. Cast scrap supply is believed to be the lowest on record.

Pittsburgh—Market here is still firm, with the exception of turnings, which are relatively weak but are being sold in the range now quoted. Scrap yard activity has increased somewhat and miscellaneous offerings are better. A few odd cars have come out from scrap yards and dealer collections are reportedly on the increase.

Chicago—New business closely approximates current consumption and prices hold at ceiling. No. 2 heavy melting, although not in strong demand, takes full ceiling, in spite of talk of shading. No. 2 dealer bundles also are at $18.75 ceiling, but baled machine shop turnings, normally considered as No. 2 bundles, and constituting a major proportion of bundle business have been sold to a consumer within the past few days for $2 less. Machine shop turnings continue their recent weakness, as do other grades of turnings and borings. It is understood WPB is preparing for another scrap drive in this area, but the idea is meeting little enthusiasm from the scrap trade. Under present dull conditions, more scrap might weaken the situation. Furthermore, yards have inadequate workers to sort and prepare material.

Warehouse . . .

Warehouse Prices, Page 188

Boston—Extended mill deliveries with prospect of reduced load allotments make more distributors wary of accepting larger direct shipment orders, notably lighter gage sheets. Demand on warehouses continues heavy and more orders are shopped around because of depleted inventories and unbalanced sizes and grades. Deliveries to warehouse, directives excepted, are from four to five weeks ahead of consumer schedules, but more secondary volume has been included in carry-overs. Alloy buying, which has been relatively active in this area, is heavier.

New York — Demand for steel from warehouse exceeds supply of wanted sizes in numerous grades of carbon and alloy stock. Individual orders tend larger, frequently all of one size. Range of inquiry is broad with only plates inclined to lag. More volume is being turned down, due to lack of wanted steel; galvanized sheets, nails, annealed wire and strip are among the tightest products, while buying of hot-rolled sheets, No. 18 gage and under is notably heavy. Cold-rolled and stainless sheets are also active.

Buffalo — Warehouse supply is tighter and labor shortage makes handling difficult. Demand is brisk, with January and February sales above a year ago and about equal to the high volume of 1941. One seller reports available labor about half that of 1941.

St. Louis — Warehouses continue to meet difficulty replenishing inventory, a condition following abandonment of the load system of allocations. Five to six months now are required for delivery instead of the former 90 days. Demand on warehouse stocks continues high.

Los Angeles — Pressure for shipment of steel from mill to consumer is cutting into warehouse supply. Demand for warehouse steel continues heavy and stocks are being broken in the absence of adequate replacement. Restoration of normal markup on material on which interim price advances were made is a relief to warehousemen, who had been forced to absorb the increase.

Seattle — Plate and bar demand is strong, both of which are tight, especially the former. There is no improvement in sheets, galvanized being most delayed. Mill delivery on galvanized is mainly six months, with some suppliers unable to do better than nine months. Stocks are not being built as sales are equal to receipts.

Cleveland—Steel distributors' inventories have been reduced substantially since the first of the year, due to heavy demand and tightening mill deliveries, on sheets and bars in particular. The number of orders and size of individual orders have increased lately.

Chicago — Mounting pressure from steel consumers and declining inventories give the picture of the warehouse trade for steel. Inquiries increase as mill deliveries become more difficult, and many have to be turned down in total or in part. The future offers little encouragement for warehouse load directives are expected to reduce the amount of steel from mills to warehouses soon after April 1.

Ferroalloys . . .

Ferroalloy Prices, Page 189

New York — Pressure for ferroalloys continues strong, with recent orders resulting in a substantial carryover in March, for the second consecutive month. Indications are that buyers have been ordering more than immediate needs,

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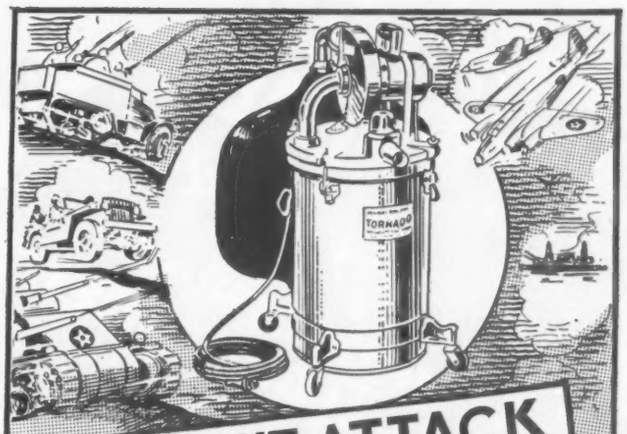

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for monthly specifications since the first of the year have been heavier than the steel industry could consume even at full capacity.

Some of this excess specifying earlier in the year appeared to be due in part to a desire to overcome transportation difficulties by placing extra amounts among the various producers. However, even now with transportation somewhat better there does not appear to be any decline in specifications.

In some products substantial buying is ascribed in part to increasingly tight situation in certain ores. There has been considerable talk for some time of a growing shortage in chrome ore. This has been particularly true with respect to the metallurgical grades, in fact, almost entirely so, for refractory chrome ore has been in fairly easy supply. Sellers of ferrochrome declare that while there may be an increasing lack of metallurgical chrome, it represents no early threat to consumers of ferrochrome, as stocks of this alloy are in good position.

Manganese Ore . . .

Iron Ore Prices, Page 188

New York — The first shipments of manganese ore from Russia to this country in many months are expected to get under way before the end of March, through the Dardanelles. These shipments, it is indicated, will start at the rate of about 25,000 tons a month, later being increased so that approximately 300,000 tons will reach this country before the end of the year.

This will supplement the higher grades of manganese now coming from India and the Gold Coast (approximately equaling the monthly arrivals from these two countries) and from Cuba. Of high quality, the ore will go far toward "sweetening" the grades now on hand in this country. A half year or so ago while stocks were substantial, grades were badly out of balance. Through an increase in the shipments from India and other points, the quality of the ore in storage here meantime has been improved, but it stands in need of further improvement, and the scheduled tonnage from Russia will prove welcome to American consumers.

All Russian ore, it is understood, will come in for the account of the United States government, whereas stocks from India and the Gold Coast will continue to be brought in for both government and private account. This is also reported to be true in the case of some of the lower grade Brazilian manganese ores, which are reported to be arriving here at the rate of 10,000 to 12,000 tons a month.

An increase in chrome ore from Turkey and Greece is anticipated soon. Refractory grades are fairly plentiful, but increased supplies of metallurgical ore from these countries will meet a real need, it is pointed out. While there is nothing definite yet with respect to resumption of shipments from the Philippines, it is generally believed that shipments may be expected somewhat later. Philippine chrome ore includes metallurgical as well as refractory grades.

Steel in Europe . . .

London — (*By Cable*) — Good inquiries are coming out in Great Britain for railroad and colliery steel but heavy structurals are slow. Activity is increasing in sheets. Plates are quiet. Demand for foundry pig iron is improving.

Canada . . .

Toronto, Ont. — Notwithstanding the fact that Canadian iron and steel prices remain under strict government ceiling with no indication of early revision, Canadian steel consumers buying in the United States are faced with the price advance in effect in that country recently. Consumers in Canada are faced with a $2 per ton advance in strip, $3 per ton on galvanized sheets, $2 per ton on plate, $3 per ton on rails, and 25 cents per keg on nails.

The serious shortage in various types of steel in Canada has resulted in increased effort to acquire supplies in the United States but there appears to be considerable difficulty in this direction, except under special priority.

In the Canadian steel markets as a whole buying is brisk and with mills almost solidly booked to the end of June, and in some instances well into third quarter, delivery is becoming indefinite. Only most essential nonwar consumers are obtaining supplies, and even these have been reduced recently. However, no shortage of steel has been reported in direct association with war production. The sharp increase in demand recently is said to be largely due to activity in production developing from United States orders in this country for shells and munitions.

Shipbuilding activities are nearer to capacity rates as a result of orders placed with Canadian builders both in the East and in British Columbia. Most of the new undertakings, however, are for use in the war against Japan. This betterment in shipbuilding has been reflected in increased plate demand, and plate mills are piling up backlogs. Most current demand is in connection with shipbuilding and specifications are being prepared for additional large tonnages to be closed over the next couple of weeks.

Inquiries for sheets are steady despite the fact that mills are filled with orders and are unable to make definite promise regarding delivery beyond directives from the steel controller. While heavy orders have been placed for both black and galvanized sheets for consumer goods, deliveries are continually being delayed.

Demand for carbon and alloy bars shows no indication of falling off as orders continue and deliveries now extend well into third quarter. Recently efforts have been made to buy bars in the United States for warehouse distribution but have met with little success. While most of Canada's bar output is going into shells and other munitions, some supplies are available for rolling stock and agricultural implements.

No improvement is reported in wire and nails and production is said to be well behind requirements. Some releases will be made to farm communities in the spring but are not expected to be sufficient to fill requirements.

With increasing demand for other types of steel, it is understood that consideration is being given to withdrawal of steel from production of structural shapes and there may be another decline in building activities. At pres-

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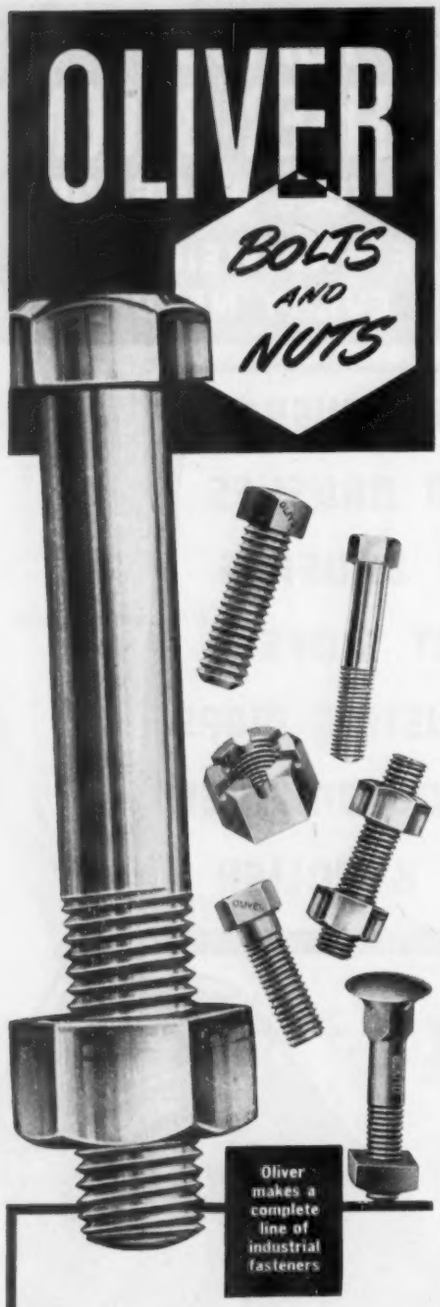

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STEEL FASTENERS

ent approximately 15,000 tons of structural steel inquiry is overhanging the market.

Iron and steel production in Canada is being stepped up in an effort to meet increased demand for finished materials. For January production of steel ingots and castings was at 88.9 per cent against 80.6 per cent for December. Pig iron production rose to 67.5 per cent from 60.4 per cent in December. Comparative figures are as follows:

	Steel Ingots, Castings	Pig Iron	Ferro-Alloys
Jan. 1945	268,722	155,969	12,130
Dec. 1944	243,482	139,152	12,391
Jan. 1944	242,186	132,128	16,495

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1600 tons, high octane gasoline refinery, Whiting, Ind., for Standard Oil Co. of Indiana, awarded through M. W. Kellogg Co., New York, to American Bridge Co., Pittsburgh.

1200 tons, high octane gasoline refinery, Philadelphia, for Gulf Refining Co., awarded through M. W. Kellogg Co., New York, to Belmont Iron Works, Eddystone, Pa.

300 tons, 12 spillway crest gates, Uruguay, to Lakeside Bridge & Steel Co., Milwaukee.

250 tons, plant addition, Lee Tire & Rubber Co., Conshohocken, Pa., to Bethlehem Fabricators, Bethlehem, Pa.

200 tons, warehouse addition, Santini Warehouse Co., Third avenue and 189th street, Bronx, New York, to Bethlehem Fabricators, Bethlehem, Pa.

140 tons, plant, Standard Steel Works Division, Baldwin Locomotive Works, at Burnham, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

3000 tons, caissons, Memphis, Tenn., for state highway commission; Merritt-Chapman-Scott Co., New York, contractor.

1570 tons, 1945 bridge requirements, various locations, for Chicago, Rock Island & Pacific railroad; bids March 1.

1200 tons, tire plant, Ottawa, Ill., for Inland Rubber Corp., Chicago; Giffels & Vallet Inc., Detroit, engineers; Darin & Armstrong, Detroit, contractors.

1000 tons, approximately, one section proposed nylon plant near Orange, Tex., for Du Pont interests.

760 tons, truck tire plant, Newark, O., for Pharis Tire & Rubber Co.

227 tons, sheet piling, pier, Hammond, Ind., for city; bids March 5.

225 tons, factory and office building, Macomb, Ill., for Hemp & Co.; bids Feb. 24.

Unstated tonnage, high octane gasoline plant, Lockport, Ill., for Texas Co.; M. W. Kellogg Co., New York, contractor.

PLATES . . .

PLATES PENDING

100 tons or more, 20 oil barges, 195 x 32 x 9 feet, and 20 coal barges, 175 x 26 x 10 feet. Defense Plant Corp., to St. Louis Shipbuilding & Steel Co., St. Louis; same yard has contract also for one steel twin-screw diesel river towboat for same interest.

REINFORCING BARS . . .

REINFORCING BARS PLACED

150 tons, Dean Sack cold storage plant, York, Neb., to Sheffield Steel Corp., Kansas City, Mo., through Construction Products.

100 tons, Virginia Mason hospital addition, Seattle, to Northwest Steel Rolling Mills, Seattle.

REINFORCING BARS PENDING

4000 tons, Naval ordnance plant, Hawthorne, Nev.

200 tons, research building, Laramie, Wyo.

150 tons, Memphis bridge substructure, Memphis, Tenn.

150 tons, barracks, hangar, and administration building for U. S. Navy, Chincoteague Island, Va.

110 tons, engine test cells, U. S. Navy, North Kingston, R. I.

100 tons, boat house and dock, army engineers, Saulte Ste Marie, Mich.; bids Mar. 21.

PIPE . . .

CAST IRON PIPE PENDING

100 tons, 16-inch water pipe and various sizes for local improvement; bids opened at Seattle March 8.

RAILS, CARS . . .

RAILROAD CARS PLACED

International General Electric Co., 15 fifty-ton steel flat cars of special design, to Berwick, Pa., plant of American Car & Foundry Co., New York.

Disposition of Light Metal Plants Weighed

(*Concluded from Page 87*)

large-scale companies." On the other hand, he felt that the fabrication of light metal and end-products could be distributed among "thousands of units."

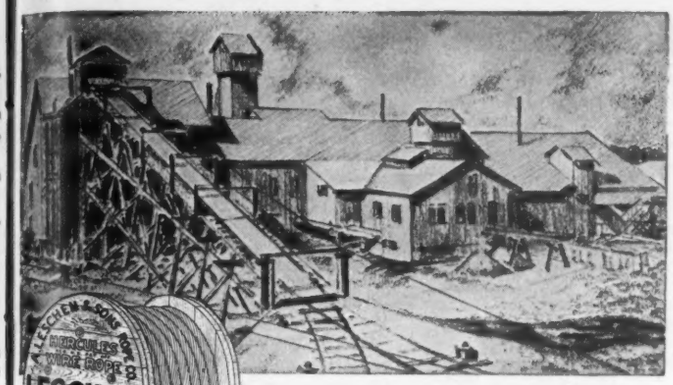
Another witness, Edward S. Christiansen, president, Magnesium Association, and president, Magnesium Co. of America Inc., warned that magnesium is a comparatively new metal whose characteristics are not yet generally known. The postwar market should be a big one, but the time required for development will depend to a large extent on how rapidly the "know-how" can be spread. His association right now is attempting to educate the trade and the public in the proper handling and use of magnesium, he said.

Plants which produced 75 per cent of last year's output of magnesium should be held on a "stand-by" basis, said Mr. Christiansen, so as to give demand a chance to catch up with capacity. He recommended great care in disposing of the government's magnesium surplus, now amounting to some 100,000,000 pounds. Unless the metal in each case is sold for purposes for which it is suitable, under the supervision of a competent technical committee, magnesium easily could come into disrepute.

Unlike other metals, whose supply is limited, magnesium is notable because its supply is unlimited, said Mr. Christiansen. No possible war exigency of the future, he said, could sever this country from the availability of magnesium.

"Potential uses for this metal and its products are such that employment gains can quite possibly be made far beyond the dreams of the most 'bullish' of magnesium-minded persons," declared Mr. Christiansen. "In times of peace, this metal will, in my opinion, find untold civilian uses.

"It is my feeling that the government should conduct research into processes, uses and markets, provided such results are properly publicized and made available to all."



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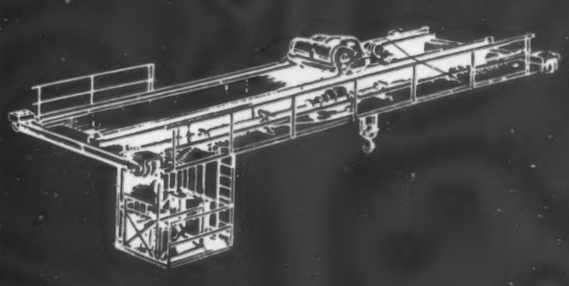

ERIE STEEL CONSTRUCTION CO • ERIE, PA.
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CONSTRUCTION AND ENTERPRISE

OHIO

CANTON, O.—Stark Machine Co. has been formed to manufacture and deal in machine tools, supplies and accessories, with $500 capital and 250 shares no par value, by D. K. Merwin and associates. E. A. McCuskey, 1322 Twenty-second street N. W., is agent.

CLEVELAND—Atlas Steel & Supply Co., 4401 Trumbull avenue, Maurice B. Abrams, president, suffered fire loss of about $30,000. Replacement will include generators, traveling cranes, air compressors, etc.

CLEVELAND—National Formetal Co., Paul W. Ellis, vice president, 6539 Metta avenue, manufacturer of bushings, bearings, bomb parts, etc., will build plant addition costing about $25,000, for which priorities have been granted.

DOVER, O.—Dover Machine Products Inc. has been incorporated with $500 capital and 250 shares no par value to operate a general foundry and machine shop, by James Bell, agent, Dover.

EUCLID, O.—Chase Brass & Copper Co. Inc. has received WPB authorization for an addition 75 x 240 feet and additional equipment for production of strip brass, etc., costing $400,000.

SALEM, O.—Deming Co., South Broadway, will construct a factory for manufacture of pumps and equipment, costing about $20,000, with WPB approval.

CONNECTICUT

COS COB, CONN.—New York, New Haven & Hartford railroad, E. E. Oviatt, chief engineer, Water street, New Haven, is making plans for power plant alterations and installations and addition of electrical facilities and capacitors, to cost about $698,000. S. Withington, Yellow building, New Haven, is engineer.

PLAINVILLE, CONN.—Job Plating Co., 136 East street, has let contract to Associated Construction Co., 195 Thames street, for a one and two-story 50 x 100 and 40 x 50-foot factory to cost about $40,000. H. F. Ludorf, 410 Asylum street, Hartford, Conn., is architect.

NEW JERSEY

LINDEN, N. J.—Main Chemical Supply Corp., 109 Price street, New York, is having plans by N. Siegler, 951 Broad street, Newark, N. J., for a one-story 100 x 140-foot plant to cost about $45,000.

NEWARK, N. J.—Federal Razor Blade Co., 97 Francis street, has let contract for a two-story factory addition to William L. Blanchard Co., 45 Pointer street, to cost about $40,000.

TRENTON, N. J.—Roller Bearing Co. of America, Whitehead road, will let contract soon for a one-story press shop addition costing about $50,000. Micklewright & Mountford, 219 East Hanover street, are architects.

PENNSYLVANIA

MORTON, PA.—Lansdowne Steel & Iron Co. is having plans made for a manufacturing plant addition costing about $165,000.

MICHIGAN

DETROIT—Buhl Co., 2730 Scotten avenue, is having plans made by Shreve, Anderson & Walker, Guaranty building, for a boiler-house costing about $50,000.

MUSKEGON HEIGHTS, MICH.—Shaw-Box Crane & Hoist Division of Manning, Maxwell & Moore Inc., is building a factory addition and administration building.

ILLINOIS

CHICAGO—Industrial Precision Grinding Co., 315 North Leavitte street, has been formed to specialize in profile centerless grinding on a contract basis. Company is partnership of Tim and Dewey Spillious.

CHICAGO—Heick Die Casting Corp., 4081 West Schubert avenue, manufacturer of aluminum and zinc die castings, is building a plant at 6500 West Diversey avenue, 23,000 square feet. Klefstad Engineering Co., 3600 West Fullerton avenue, is contractor.

CHICAGO—Everede Tool Co., 302 North Loomis street, manufacturer of boring bars and bits, is building a one-story 50 x 100-foot plant at 2000 North Parkside avenue. Olsen & Urbain, 75 East Wacker Drive are architects and Klefstad Engineering Co., 3600 West Fullerton avenue, is contractor.

CHICAGO—Arrow Pattern & Foundry Co., 2720 West Lake street, is building one-story 50 x 135-foot addition to brass and aluminum foundry, pattern shop and pressure cast matchplate department. Kocher & Larson Co., 506 West Sixty-third street, is architect and contractor.

INDIANA

DELPHI, IND.—Globe Valve Co., S. Young, manager, will take bids soon for a one-story 100 x 300-foot plant to cost about $100,000.

INDIANAPOLIS, IND.—Peerless Furnace Co. and Peerless Foundry Co. suffered estimated loss of $250,000 by fire, which destroyed or damaged office building, foundry and machine shop.

INDIANAPOLIS—Link Belt Co., 220 South Belmont street, is making plan for power plant improvements, including boiler, generator and piping, to cost $100,000. Bevington, Taggart & Fowler Inc., 730 Indiana Pythian building, is engineer.

WISCONSIN

RACINE, WIS.—Racine Die Casting Co. has been incorporated to manufacture aluminum and brass castings, by L. O. Wells, Walter E. Kleeb and John A. Kraus.

WATERTOWN, WIS.—Waukesha Foundry Co., Waukesha, Wis., plans construction of a foundry at Watertown, its five-year lease on plant of Monarch Tractor Co. expiring early in 1946.

WISCONSIN RAPIDS, WIS.—Prentiss-Wabers Products Co., manufacturer of gasoline stoves, fuel oil heaters and camp equipment, plans a one-story addition 125 x 330 feet. A. F. Billmeyer & Son are architects.

MINNESOTA

MINNEAPOLIS—Midwestern Metal Products Co., Peter Platzer, president, tool manufacturer, has let contract to Ludwig A. Pavlo for a one-story factory 86 x 140 feet at 3232 East Fortieth street.

ST. PAUL—Bonk Machine Works, J. W. Bonk, proprietor, has let contract to Harold Purtell for remodeling building at 638 Robert street for use as a machine shop.

IOWA

CLINTON, IOWA—Climax Engineering Co., manufacturer of gas and oil engines, announces it will manufacture a line of automatic water systems as first of new postwar products. E. F. Deacon is president.

DES MOINES, IOWA—New Monarch Machine & Stamping Co., 406 Southwest Ninth street, has let contract to Wm. Knudson & Sons, Flynn building, for a two-story factory 120 x 160 feet.

DES MOINES, IOWA—Defense Plant Corp. has let contract to A. H. Neuman & Bros. Inc., Hubbell building, for a three-story tire factory addition 170 x 220 feet, to cost about

THE use of worm gear speed reduction in Reading Electric Hoists allows you to fit the hoist to your plant layout subject to local conditions of clearance, space available, etc. These hoists are composed of four interchangeable units — suspension unit, hoisting unit, motor unit and control unit. Under this Reading Unit Construction Plan, 144 different combinations of these units are available to give you special equipment at the low cost of standard parts.

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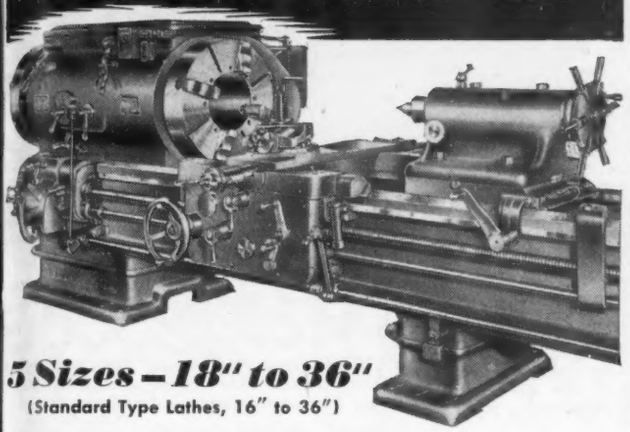

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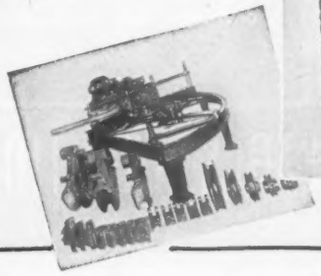

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WRITE FOR PRINTED MATTER

$700,000, to be operated by the Lake Shore Tire & Rubber Co.

WATERLOO, IOWA—Lewis Machine Works has been incorporated to operate a general machine shop. B. J. Lewis is president and W. A. Everett is vice president and secretary.

MONTANA

FAIRFIELD, MONT.—Bids have been opened for a water system, including two pumps, a 60,000-gallon elevated tank and 20,700 feet of four and eight-inch pipe and accessories. Bonds for $75,000 have been approved. Corwin & Co., Great Falls, Mont., are engineers.

GREAT FALLS, MONT.—Great Northern railroad has let contract to Dudley Anderson Co. to construct servicing and repair shops for diesel locomotives, 50 x 222 feet, to cost about $200,000.

GREAT FALLS, MONT.—Great Northern Railway, Railway building, St. Paul, has let contract to Dudley Anderson Co., Great Falls, for a one-story diesel engine shop 50 x 222 feet and 25 x 113 feet.

WYOMING

CASPER, WYO.—Frisby Machine Works, Dean Frisby, proprietor, is building a one-story machine shop addition.

CALIFORNIA

GARDENA, CALIF.—Specialty Products Co., 16615 Halldale avenue, is building a machine shop 48 x 48 feet, to cost about $3500.

LOS ANGELES—Steamaster Automatic Boiler Co. has permit for plant addition at 5819 Compton avenue, 36 x 64 feet.

LOS ANGELES—Union Iron & Steel Co. will build a machine shop 38 x 72 feet at 1600 North Indiana street, to cost about $4000.

LOS ANGELES—Acme Valve Services, 133 North Durfee street, has building permit for machine shop addition 24 x 30 feet in Whittier district.

LOS ANGELES—C-F Equipment Co., 2309 East Eighth street, has let contract to Ted R. Cooper Co. Inc., 1031 South Broadway, for a maintenance shop covering 7000 square feet at 1661 McGarry avenue, to cost about $19,500.

LOS ANGELES—Hollywood Transformer Co., 645 North Martel avenue, noted Nov. 27 as newly incorporated, has elected Edward O. Woodward, president, James D. Corbett, vice president, and Dolly L. Stofer, secretary-treasurer.

LOS ANGELES—Fruehauf Trailer Co. has let contract to Collins Construction Co., 5137 South Boyle avenue, for a plant building 50 x 680 feet, to cost an estimated $125,000. Will be superstructure over loading dock now under construction.

LOS ANGELES—Generator Equipment Co. will build a one-story factory at 5551 West Washington avenue, 30 x 90 feet, to cost about $10,500. Contract has been let to Frank Schoenrock, 626½ South La Brea avenue. Frank L. Stiff, 1303 Park Central building, is architect.

OAKLAND, CALIF.—Pacific Industrial Mfg. Co. has bought a site at 848 Forty-ninth avenue for expansion of its plant.

OAKLAND, CALIF.—Romak Iron Works has bought a site at 3440 Harlan street for a plant addition.

SAN FRANCISCO—Reliance Trailer & Truck Co. Inc. has bought a 200,000-square foot industrial site with spur track at Jerrold and Napoleon street for postwar expansion.

VENICE, CALIF.—Micro Parts has permit for building plant at 5737 West Century boulevard, 40 x 120 feet, to cost $9500.

VERNON, CALIF.—McCullough Tool Co., 5820 South Alameda street, will build a storage vault costing about $5500.

VERNON, CALIF.—Norris Stamping & Mfg. Co., 5215 South Boyle avenue, is having plans made for a plant addition, one-story, 151 x 360 feet, to cost about $245,000. Plans are by Webber Co., engineers, D. I. Hollingsworth building, Los Angeles.

OREGON

McMINNVILLE, OREG.—Todd Construction Co., Eugene, Oreg., has contract for a $38,000 elevator and warehouse addition for Buchanan-Allers Grain Co.

PORTLAND, OREG.—Bur-Will Steel Works, 407 SE Morrison street, plans construction of a plant addition at 3900 St. Helens road. Lee A. Thomas, Platt building, is architect.

WASHINGTON

GRANDVIEW, WASH.—Priorities have been granted for a $70,000 disposal plant. George Douglas, city engineer, has prepared plans.

PUYALLUP, WASH.—Parker & Hill, engineers, Seattle, are preparing plans for a proposed sewage disposal plant and sewer system, estimated at $600,000. Bond issue will be voted on soon.

SEATTLE—Truax Machine & Tool Co., 116 West Michigan street, plans a machine shop 36 x 50 feet for early construction.

SEATTLE—Navy has approved a proposed $1,000,000 improvement program at Sand Point air station, involving a large warehouse. Plans also have been approved for a $39,000 sludge plant near Manchester, Wash

TACOMA, WASH.—City has allocated $60,000 and will call bids soon for a power substation and equipment.

VANCOUVER, WASH.—City is considering bids, opened Feb. 21, for a steel water tower and tank, estimated to cost $25,000. Marvin Ray is city engineer.

DPC Authorizes Plant Expansion, Equipment

Defense Plant Corp. has authorized the following expansions and equipment purchases (figures are approximate):

Aerojet Engineering Corp., Pasadena, Calif., $1 million increase in contract to provide additional equipment at a plant in Azusa, Calif., making overall commitment $2,500,000.

Akron Standard Mold Co., Akron, O., $50,000 to provide equipment at a plant in Akron.

Chase Brass & Copper Co. Inc., Waterbury, Conn., $9,800,000 increase in contract to provide additional plant facilities at Euclid, O., making overall commitment $30,000,000.

Consolidated Vultee Aircraft Corp., San Diego, Calif., $400,000 increase in contract to provide additional equipment at a plant at New Orleans, making overall commitment $12,450,000.

Electrol Inc., Kingston, N. Y., $40,000 increase in contract to provide additional equipment at a plant in Kingston, making overall commitment $1,500,000.

Hupp Motor Car Corp., Detroit, $100,000 increase in contract to provide additional equipment at a plant in Detroit, making overall commitment $350,000.

McAleer Mfg. Co., Rochester, Mich., $110,000 increase in contract to provide additional facilities at Rochester, making overall commitment $325,000.

McCrory Tire & Rubber Co., Indiana, Pa., $100,000 increase in contract to provide additional equipment at a plant at Indiana, making overall commitment $750,000.

Pratt & Whitney Aircraft Corp. of Missouri, East Hartford, Conn., $6,300,000 increase in contract to provide additional facilities at a plant at Kansas City, Mo., making overall commitment $85 million.

Scoville Mfg. Co., Waterbury, Conn., $2,600,000 to provide equipment at a plant in Waterbury.

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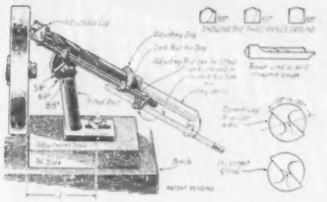

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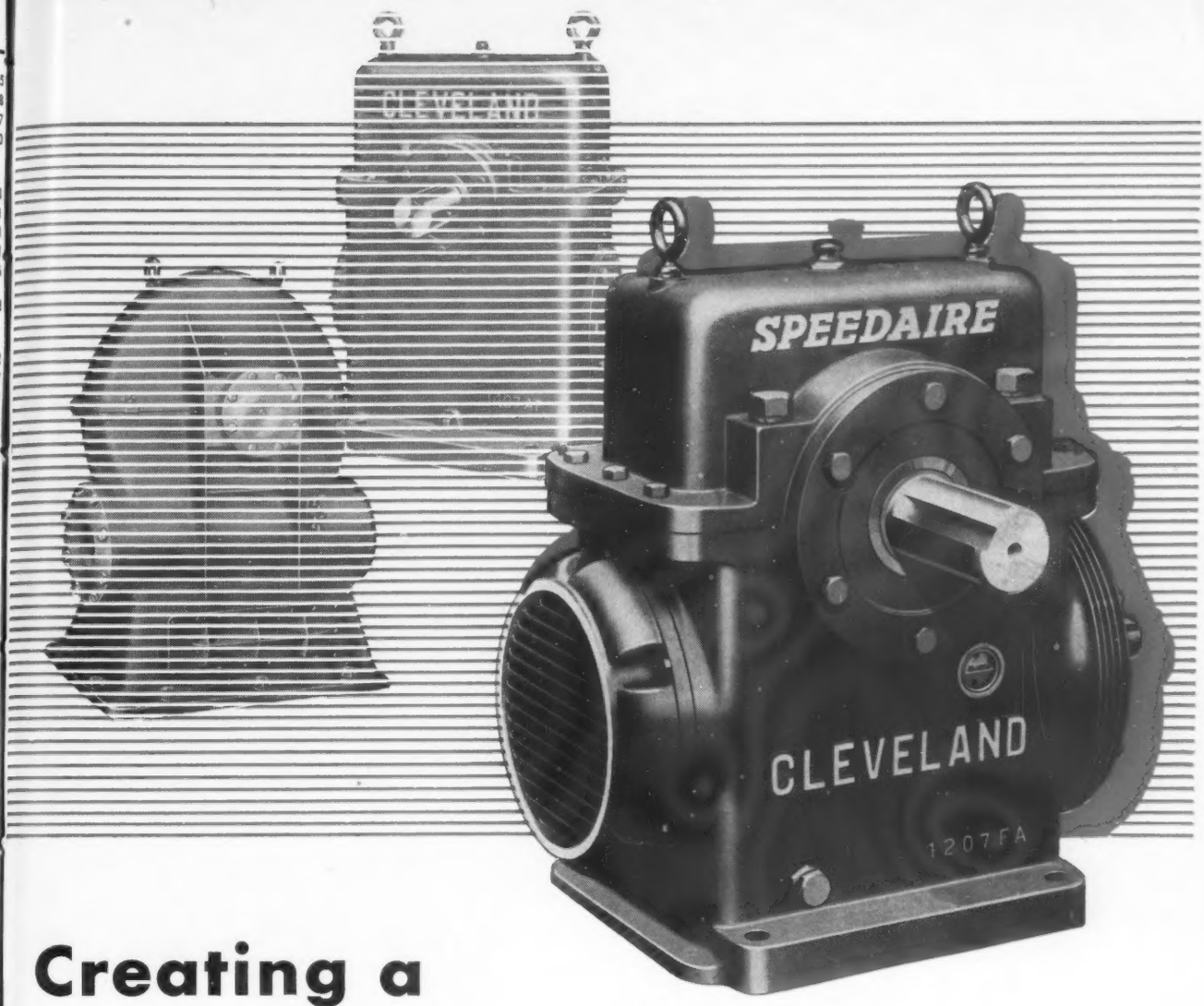

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